

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.

PUBLISHED EVERY FRIDAY BY THE RAILROAD GAZETTE AT 83 FULTON STREET, NEW YORK
BRANCH OFFICES AT 375 OLD COLONY BUILDING CHICAGO, AND QUEEN ANNE'S CHAMBERS WESTMINSTER, LONDON

EDITORIAL ANNOUNCEMENTS.

THE BRITISH AND EASTERN CONTINENTS edition of the Railroad Gazette is published each Friday at Queen Anne's Chambers, Westminster, London. It contains selected reading pages from the Railroad Gazette, together with additional British and foreign matter, and is issued under the name Railway Gazette.

CONTRIBUTIONS.—Subscribers and others will materially assist in making our news accurate and complete if they will send early information of events which take place under their observation. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired.

ADVERTISEMENTS.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

OFFICERS.—In accordance with the law of the state of New York, the following announcement is made of the office of publication, at 83 Fulton St., New York, N.Y., and the names of the officers and editors of The Railroad Gazette:

OFFICERS:
W. H. BOARDMAN, Pres. and Editor
E. A. SIMMONS, Vice-President
RAY MORRIS, Secretary
R. S. CHISOLM, Treas.
I. B. RINES, Cashier
L. B. SHERMAN, Western Manager.
EDITORS:
RAY MORRIS, Man'g Editor
BRAMAN B. ADAMS
CHARLES H. FRY
RODNEY HITT
GEORGE L. FOWLER
FRANK W. KRAEGER
HUGH RANKIN
BRADFORD BOARDMAN

CONTENTS

EDITORIAL:	Four Wheel Switching Locomotive.....	560	The Bureau of Explosives	561
Strike on British Railroads	Some Early Royal Railroad Journeys....	566	The Action of Sea Water on Concrete....	565
Failures of Steel Tires.....	CONTRIBUTIONS:		Foreign Railroad Notes:	
Competition and Confiscation Under the	Firing Stationary Boilers.....	550	Berlin Suburban Traffic.....	560
Anti-Trust Law	MISCELLANEOUS:		Prussian Freight Car Mileage	566
Reading Company.....	Railroad Law in August.....	551	GENERAL NEWS SECTION:	
Central of New Jersey	American Railway Association.....	553	Notes	567
Missouri Pacific	Car Efficiency for April	553	Trade Catalogues	569
Western Maryland	Certificates of Public Necessity and Con-		Obituary	570
Canadian Northern	venience in Massachusetts	556	Meetings and Announcements.....	570
New Publications	Commissioner Clark on the Freight Car		Elections and Appointments	570
ILLUSTRATED:	Situation	557	Locomotive Building	571
Curve and Switch Tables	Steam and Trolley in Indiana.....	558	Car Building.....	571
Pacific Locomotive for N. Y., N. H. & H.	Investigation of Steel and Structural		Railroad Structures	572
A New Idea in Car Wheels.....	Members by the Watertown Arsenal....	561	Railroad Construction	572
Standard Location for Third Rail.....			Railroad Corporation News	574

VOL. XLIII., No. 19.

FRIDAY, NOVEMBER 8, 1907.

The long-expected crisis in British railroad labor troubles was reached last Sunday when Richard Bell, M.P., Secretary of the Amalgamated Society of Railway Servants, the strongest of the British railroad labor unions, announced that the recent balloting in the Society had resulted in a vote of 76,925 in favor of a general strike and 8,773 against. The Executive Committee of the Society was empowered to declare the strike at any time, but it expressed a desire to meet with Mr. Lloyd-George, President of the Board of Trade, and a committee of railroad directors and arrange, if possible, a compromise or truce. This meeting was held on Wednesday, and it is reported that the railroads agreed to accept the principle of arbitration of disputes through representative committees of their employees without openly recognizing the existence of the union. The strike was for recognition of the Society and the right of its officers to treat with the railroads on behalf of its members. This claim of recognition arose primarily from the passage last year of the Trades Dispute Act which in effect reversed the famous Taff Vale decision which held any trade union and its treasury funds responsible for acts done by its officers within the scope of their authority. The railroads were unanimous in resisting the demand because if recognition of the union were granted, the directors would be compelled to meet representatives of the union and agree on a settlement of disputes between the company and its employees. The directors would then be bound by law to make good their promises and the stockholders would be liable to pay any damages awarded for failure to carry out the promises. The union, on the other hand, is not responsible in money, and the members could repudiate at will any of the agreements made by their officers. The A. S. R. S. has over 100,000 members in all of the lower grades, or one-sixth of the total number of employees. These include trainmen, switchmen, trackmen, porters and signalmen. The engine drivers and firemen are not in sympathy with the idea of a strike.

FAILURES OF STEEL TIRES.

The discussion of the paper on "Causes of Failures of Steel Tires*" by G. L. Norris, at the October meeting of the Western Railway Club, developed wide differences of opinion as to the cause of shelling out, the most common defect of steel tires. The author

of the paper attributed most of the failures in service from shelling out to conditions over which the maker had no control, such as brake burns and bad mating of wheels on the same axle, causing eccentricity and pounding. Some of the members who took part in the discussion believed the trouble to be due to inherent defects of the steel for which the maker was responsible, basing this belief largely on the absence of any other explanation so far advanced which would cover all of the peculiar circumstances under which such failures usually occur. While Mr. Norris may be right in his contention that the maker is not responsible, the fact remains that tires are failing in service from this cause, and, as in many other details of railroad equipment, it devolves on the maker to produce tires which will not fail under the conditions as they exist. Heavy wheel loads must be used in building locomotives powerful enough to haul long trains at high speed, and powerful brakes must be used on the wheels to stop such trains. These may be conditions over which the tire maker has no control, but they are conditions which his product must be made to meet.

The careful methods of mechanical and heat treatment in use to-day have undoubtedly reduced to a minimum the inherent defects in the steel used for tires, but they cannot eliminate the inherent ductile properties of steel. The trouble from shelled out spots in steel tires can be explained in almost every case by going back to the inherent property of steel to stretch or flow under pressure. A steel tire on a locomotive in road service revolves in one direction probably 95 per cent. of the time. This long-continued rolling action causes the metal in the tire to gradually flow back around the wheel in the opposite direction to the normal direction of rotation, and the metal near the surface of the tire becomes more or less laminated. Eccentricity of wear due to weak centers or eccentricity of mounting on the axle produce hammer blows which intensify the rolling action and tend to break up the flowing metal into layers. When the brakes are applied the drag of the brake shoes tends to force the metal back to its normal condition, and if the applications are moderate and frequent, they may almost entirely counteract the rolling action. However, when the brakes are applied hard enough to lock the wheels and cause skidding, the small area of overrapping metal in contact with the rail is suddenly heated to a high temperature, and at the same time is torn partially or wholly away from the layer underneath, with the result that a piece shells out. The size of the shelled out spot will depend on the extent to which the lamination of the metal has progressed, the length of the skidding and the friction between the sliding

*This paper was reprinted in full in the Railroad Gazette, Oct. 25 and Nov. 1, pages 495 and 532.

wheel and the rail. Only slight differences in the relative ductility of two tires mounted on one axle, accompanied by a difference in brake shoe friction, will result in different degrees of flowing and lamination. It will also be seen that any difference in the wheel loads due to imperfect equalization or in the character of the surface of the two rails over which the wheels slide, would affect the force tending to tear away the laminated metal in the tire. This explains in most part the curious cases of shelled out wheels sometimes cited in defence of the theory of inherent defects in the steel in which only one wheel out of a set of eight will develop such spots.

Chilled cast-iron wheels under the same conditions develop cracks along the cleavage lines of the crystals of chilled iron, that is, at right angles to the surface of the tread. The intense heat generated by the skidding wheel breaks down the adhesion between the grains, and the drag of the rail opens up the cracks.

The tendency of truck and tender wheel tires to shell out quicker and more frequently than driving wheel tires can be explained by their smaller diameter and the fact that they skid more often. The area of contact between the wheel and rail is less with a small wheel than with a large wheel, and the intensity of unit pressure is correspondingly greater for the same loads. Truck wheels often carry loads as great as driving wheels carry. This increased unit pressure has more effect in producing a deeper rolling action and a pronounced flow of metal. For the same reason, when the wheel skids the adhesion is localized and tends to tear loose the laminated metal deeper down into the tire, thus producing larger shelled out pieces. Other causes which tend to intensify the rolling action are slight eccentricity in the tire and the pounding action of the wheels when running with a light load carried on stiff springs. It is also true that truck and tender wheels are often braked with a higher percentage of brake shoe pressure than driving wheels. As they are not coupled with other pairs of wheels and are frequently imperfectly equalized, local conditions of excessive brake shoe friction or instantaneous reduction of pressure on the rail may produce skidding.

If this theory is true, the remedy is obviously to use steel with a higher carbon content and having less ductility. But another cause of tire failures, heat cracks in the flange, is probably due to a lack of sufficient ductility. When a tire expands from the heating action of the brake shoe the flange stretches more than the tread, and if the ductility is low, small cracks appear at the point of the flange and gradually work in. What can be done to produce a steel of mean ductility to meet both of these conditions is a problem for the tire maker to solve. If it was possible to make a tire with a deeply case-hardened tread and annealed flange, the trouble from both causes might disappear. That the tire makers are bending every effort toward producing satisfactory tires is shown by the statement made during the discussion of the paper by Samuel M. Vauclain: "The question of cost has not the slightest influence on the quality of the material which goes into a tire. We are determined that if a better tire can be made and if these defects which are found in service can be eliminated, they will be eliminated." How different from the attitude of the rail makers!

COMPETITION AND CONFISCATION UNDER THE ANTI-TRUST LAW.

There have been a good many indications in the last few months that the crudely drawn and ill-defined portions of the Sherman Anti-Trust Law which make it impossible for any two or three gathered together in one place to know whether they are malefactors or not, might be the subject of revision by Congress this winter. We have always maintained that the language of the Sherman law was little short of ridiculous, and that it was so sweeping in its interdictions that only the courts knew what it meant, and then only in cases that had come before them.

The whole fabric of American railroad legislation rests on two principles which are all but irreconcilable with each other; first, that carriers serving the same or adjacent territory must compete with each other; second, that rates for like and contemporaneous service under substantially similar circumstances and conditions must be the same to all comers; that is to say, not competitive, and that one city or territory must not be built up at the expense of another (long-and-short-haul clause); a process which is fundamentally and naturally the result of competition. The Act to Regulate Commerce prohibits pooling, and the Anti-Trust law apparently makes every kind of agreement between persons engaged in the same kind of business an act of conspiracy, so that Congress

has thus strongly affirmed the competitive principle. Yet the 1906 revision of the Commerce act makes it specifically impossible for a carrier to change its rates without giving 30 days prior notice to the Interstate Commerce Commission, unless the commission exempts it by special action. This provision is, of course, along lines the reverse of competitive, since a 30-day-notice cut rate is not an effective competitive device. In a word, the railroads are told with blunt plainness that they must compete and are then immediately reminded that they must not.

The Sherman Anti-Trust Act of 1890 says definitely that every person who shall make a contract or engage in any combination in the form of a trust or otherwise, in restraint of trade or commerce, shall be guilty of misdemeanor and subject to severe penalties, which have been made cumulative by subsequent court decisions, and eminent corporation counsel have expressed the opinion that it is technically impossible for two grocers in the same block to walk down the street together and agree on the price at which they will sell eggs without rendering themselves liable to fine, imprisonment and three-fold damages payable to any other grocer whose business had been injured by the reduction in prices upon which they had agreed. Thus the doctrine of individual competition is upheld with tremendous vigor, while trade agreement or collective competition, is strongly repressed.

What unrestricted competition means in the transportation field need to be told no one who has in mind the history of the years when the trunk line territory was aroused by new comers, or of the period prior to the formation of the Southern Railway & Steamship Association, in the South. Albert Fink estimated that the rate wars of this period reduced gross earnings of the southern railroads about 42 per cent. below what regular rates would have allowed, a sum equal in many cases to the entire net earnings which could have been derived from the competitive business at the regular rates, and in 1876 a committee of stockholders of the Central Railroad & Banking Company of Georgia reported, "it is conceded that the property of your stockholders is on the brink of being sunk forever, and the bankruptcy of a number of your roads is imminent if not even now a fact." It is, of course, familiar history how the association stopped this era of frightful waste and how the rate committee of the association divided business between competitive points, established differentials between different towns and made classifications of freight. The roads were assigned a percentage which they could carry, similar to the coal agreements of recent years, and these percentages were determined with the greatest care and were at all times subject to revision under protest. To facilitate payments, a deposit of 20 per cent. of the receipts from pooled business was made by each road, and weekly and monthly balances were cleared with great precision.

The passage of the original Interstate Commerce Law of 1887 stopped the pooling feature of this agreement, the 20 per cent. payments, and the payment by one road to another of whatever excess that road may have earned above its due allotment, but reports of business and earnings were continued daily, and through rates were still very largely under the influence of the rate committee of the Southern Railway & Steamship Association, although each road tried to conform to the requirements and decisions of the newly formed Interstate Commerce Commission. The association thus maintained its usefulness as a guarantor of harmony and used its power to fine roads which attempted to make trouble. But even this was stopped by the passage of the Sherman act. The associations are now become only conferences, and destructive and long-drawn-out competition has been in the main prevented probably not so much by the strength of these conferences as by the fact that the roads of which they are formed realize that they have all to lose and nothing to gain by contests of this kind.

But a stronger reason than this for harmony has been the fact that the Sherman law, in its earlier days, was construed loosely. It was well known that the law was not aimed at railroads, and only the Roosevelt administration has sought to apply it to railroads with any real show of vigor; consequently, in the last period when railroad facilities really exceeded the demands upon them—for about 18 months, in 1897 and 1898—the railroads throughout the country did not have the same fear of maintaining rates by agreements that they have now, while since that time traffic everywhere has been so much in excess of facilities that it has not much mattered whether agreements were in effect or not. With the exception of a few sporadic struggles for grain traffic, and especially Gulf-bound grain traffic, it may be said that there has been no rate war of consequence since the passage of the Sherman act.

The extremely interesting question of the present day is, what

will be the effect of the government's heroic efforts to require competition between carriers if we are to go through a year or so of diminished business activity, and if the facilities of the carriers overtake and really pass by the traffic offered them. Are we then to maintain rates by that strangest of phenomena—an agreement entirely unenforceable,—are we to have the destructive competition of the sixties and the seventies, or are the peculiarly childish and uneconomic features of the Anti-Trust law that forbid combination to prevent wasteful competition, to be abolished?

It is well known that in the days of highly unrestricted competition the general public did not gain thereby. Henry S. Haines believes* that much of the present hostility towards corporations, and especially towards railroads, is the outgrowth of the rather barbarous efforts of lines suffering from unrestricted competition to recoup themselves from non-competitive territory, until the manner in which service should be performed in non-competitive regions became a political issue, while all through the latter part of the strongly competitive period (1870 to 1880) the railroads were busy making enemies and competing themselves into bankruptcy. Charles Francis Adams, Jr., in reviewing the history of railroad traffic in England, called attention 20 years ago to George Stephenson's remark that where combination is possible, competition is impossible, and pointed out that in the face of all the legislation designed to require competition in Great Britain the lines obstinately refused to compete. In 1872 a British Committee on Railroad Amalgamation was appointed, including in its number two very able men, the Marquis of Salisbury and the Earl of Derby, and this committee showed with great precision how, in 40 years of railroading, English railroad legislation had never accomplished anything which it sought to bring about nor prevented anything which it sought to hinder, while the cost to the companies of the useless mass of legislative enactments (3,300 of them) was placed at £80,000,000. The conclusion of the committee at that time was that competition between railroads existed only to a limited extent and could not be maintained by legislation. The committee showed further that the North-Eastern Railway was composed of 37 independent companies, several of which had formerly competed with each other, and that prior to their consolidation these lines had, generally speaking, charged higher rates and been able to pay small dividends. But now (1872) the North-Eastern was the most complete monopoly in the United Kingdom. From the Tyne to the Humber it held the whole country to itself, and it charged the lowest rates and paid the highest dividends of all the great English combinations. It was not vexed by litigation, and while numerous complaints were heard from Lancashire and Yorkshire, where railroad competition existed, no one had appeared before the committee to prefer any complaints against the North-Eastern.

In view of such facts as these, the committee reported that amalgamation had not brought out the evils that had been anticipated, but, in any event, long and varied experience had fully demonstrated the fact that while Parliament might hinder and thwart, it could not prevent it, and it was equally powerless to lay down any general rules determining its limits or character.

This report is so excellent a document on the subject of legislative prevention of competition that we have quoted freely from Mr. Adams, who refers to it in his *Railroad Problems* (1886). It now remains to be seen whether this country has learned the lesson as well as England did or whether there must be more harsh and futile law making before we reach the state of legislative intelligence which England arrived at 35 years ago. As if to give special point and appropriateness to the urgency of a wiser law at this time, it is not yet a month since the Department of Justice, acting under section 6 of the Sherman law, directed the seizure of some \$7,000 worth of tobacco in transit from factories of the British-American Tobacco Company Limited, located at Petersburg, Va., and at Durham, S. C., to New York and foreign countries, on the ground that the property was owned under a contract entered into by two American tobacco companies and three English concerns to limit competition. This is the first time that the seizure clause of the Sherman law has been employed. Its practical effect, of course, is to make the owners of the tobacco come into court and prove their own innocence, in reversal of the established common law principle; and its indirect effect is to make substantially every corporation within the length and breadth of the United States realize that it exists and does business only because it has not as yet been the whim of the government to attack it. We pointed out in reviewing the Northern Securities' decisions that the language used by the court would apply equally well to a very large number

of other great railroad combinations in this country, and this was brought home so strongly to the government that it felt compelled to announce at that time that it did not intend to "run amuck." The tobacco seizure under the Sherman law only brings new force to the contention that the prosperity of the country and the stability of its great and law-abiding corporations, railroad and other, should be entrenched a long way beyond the powers of the government or of any officer of it to "run amuck."

Reading Company.

The Reading Company controls the operations of two principal subsidiaries—the Philadelphia & Reading Railway and the Philadelphia & Reading Coal & Iron Company. In addition it owns all the capital stock of the Reading Iron Company, but the operations of this company are not made public. Under the arrangement which is in force between the two subsidiaries, the Coal & Iron company usually shows a deficit, and the income of the Reading Company which goes to pay dividends on its stocks comes from the Railway company. The Reading Company's report includes a great deal of information about the different companies, but, on account of the bookkeeping involved in the relations between the three, and because considerable necessary information is not given, it is not easy to get a clear and complete view from it of the operation and standing of the railroad and coal companies.

The year's production of anthracite coal from lands owned, leased and controlled by the Coal & Iron Company, was 11,655,100 long tons, an increase of 996,000 tons, or 9 per cent. over the previous year. The company's coal sales increased 12 per cent. over the previous year. The cost of coal mined and purchased was 1½ cents less per ton than in 1906 and the price realized 3.1 cents a ton more, making an increase in the net amount received of 4.6 cents per ton. Receipts from the sale of anthracite were \$4,500,000 larger than in 1906, and receipts from the sale of bituminous and from other sources \$200,000 larger, so that there was an increase of \$4,700,000 in the Coal & Iron Company's gross receipts. Its expenses, however, rose \$4,400,000, so that the net earnings of the year were only \$300,000 larger than in 1906. The principal increases in expenses were \$1,800,000 in cost of mining and repairs (there were 900,000 more tons mined by the company) and \$1,600,000 in cost of transportation by rail and water (there were 1,200,000 more tons sold). The net earnings were \$3,500,000, from which \$1,300,000 was appropriated for new work at collieries; \$1,600,000 paid to the Reading Company as interest at 2 per cent. on money advanced, and \$500,000, being 5 cents a ton on coal mined from the company's lands during the year, put in the Depletion of Lands fund. In addition there were fixed charges and taxes amounting to \$115,000, leaving a final deficit for the year of \$71,000.

The Philadelphia & Reading Railway, on the other hand, had a net income of \$7,900,000 for the year. Out of this, \$1,800,000 was appropriated for improvements and \$6,000,000 paid in dividends to the Reading Company, leaving a small surplus. The increase in gross earnings was just under \$3,000,000. Operating expenses, however, increased \$3,800,000, leaving net earnings smaller than in the previous year. Both because of this increase in net earnings and because there was a special call for funds in the 1906 year to complete unusually extensive work which had been in progress for some time, the improvement appropriation was \$1,700,000 less than in 1906. No new work of any importance was undertaken last year, so that the improvement expenditures could be reduced. The principal item of the \$1,800,000 spent for improvements was \$990,000 for main, second, third, fourth, yard and station tracks.

Earnings from coal and from merchandise traffic both increased, the former by \$1,500,000, the latter by \$1,100,000. The anthracite tonnage carried was 13,200,000 tons, an increase of 1,400,000 tons, or 12 per cent. over 1906. The bituminous tonnage was 11,200,000 tons, a gain of 700,000 tons, or 7 per cent.. The revenue from coal traffic increased 9 per cent. The merchandise traffic increased 9 per cent. and the merchandise earnings 7 per cent. There was an increase of 3 per cent. in the passenger earnings.

Operating expenses were 17 per cent. larger than in 1906. Maintenance of way increased 13 per cent., maintenance of equipment 26 per cent. and conducting transportation 14 per cent. A statement that these increases were in general due to "the increased volume of business handled, the increase of wages and the higher price of materials" sums up succinctly the increased costs which most railroad companies have been facing during the year.

Maintenance of way cost \$3,610 per mile owned and leased, against \$3,195 in 1906. Repairs and renewals cost \$3,245 per locomotive, against \$2,228 in 1906, a very large increase, due apparently to specially large expenditures necessary to keep the locomotives owned under equipment trusts at their original value and efficiency as provided in the leases. The passenger car figure was \$591, against \$610 in 1906, and the freight car, \$73, against \$62 in 1906.

The report records that on November 1, 1906, one-way passenger fares were reduced to 2½ cents a mile over the whole system with-

*Railway Corporations as Public Servants.

out disturbing commutation or excursion rates. On May 25, 1907, fares in the suburban district of Philadelphia were advanced to make them correspond with rates in force on other parts of the system. On November 1, 1906, there was also an increase of 10 per cent. made in the wages of all employees receiving less than \$200 a month. An increase in the same proportion had been made in November, 1902.

The Reading's tidewater terminal is at Port Richmond, near Philadelphia. Tables are given showing the outbound ocean business to foreign and domestic ports during the past six years and also the shipments from Port Richmond to rail points, mostly on the line of the Philadelphia & Reading. The merchandise shipments last year outbound were 1,130,000 short tons, the anthracite coal shipments 1,900,000 long tons and the bituminous coal shipments 1,800,000 long tons, this last an increase from 1,400,000 tons in 1906. The rail shipments from Port Richmond have increased from 850,000 short tons of merchandise and iron ore in 1905 to 1,400,000 tons last year.

No table of commodity tonnage figures is given, so that it is impossible to form an accurate idea of the extent and character of the road's traffic. The ton-mile rate for coal traffic is not given, but works out at 0.691 cents. The rate on merchandise was 0.946 cents. The passenger-rate reduction seems to have affected the passenger-mile rate only slightly. The decrease is less than 1 per cent.

The only information published about the Reading Iron Company is a few facts about its balance sheet. The assets stand at \$13,400,000, an increase of \$1,000,000 during the year. The capital stock remains at \$1,000,000, all owned by the Reading Company, and the outstanding mortgage bonds have been reduced during the year; at the same time current liabilities, accrued interest and dividends are less. It is evident that there is a profitable equity.

The accompanying map shows the Reading Company's system, including the Central Railroad of New Jersey, whose report is reviewed below, and the Lehigh & Hudson River, which gives the system an outlet to the Campbell Hall gateway and thence by the New Haven system over the Poughkeepsie Bridge to New England.

The results of the last two years' operation of the Philadelphia & Reading Railway are summed up in the following table:

	1907.	1906.
Mileage worked	999	1,000
Passenger earnings	\$6,399,173	\$6,216,316
Freight earnings	16,360,170	15,220,441
Coal freight earnings	18,730,190	17,198,247
Gross earnings	42,676,278	39,658,041
Maint. way and structures	3,606,192	3,195,152
Maint. of equipment	7,971,544	6,330,882
Conducting transportation	13,564,854	11,896,370
Operating expenses	25,889,331	22,137,172
Net earnings	16,786,947	17,520,869
Net income	7,892,359	8,923,824
Dividends	6,000,000	6,000,000
Improvement appropriations ..	1,847,934	3,539,352
Year's surplus	44,425	615,528*

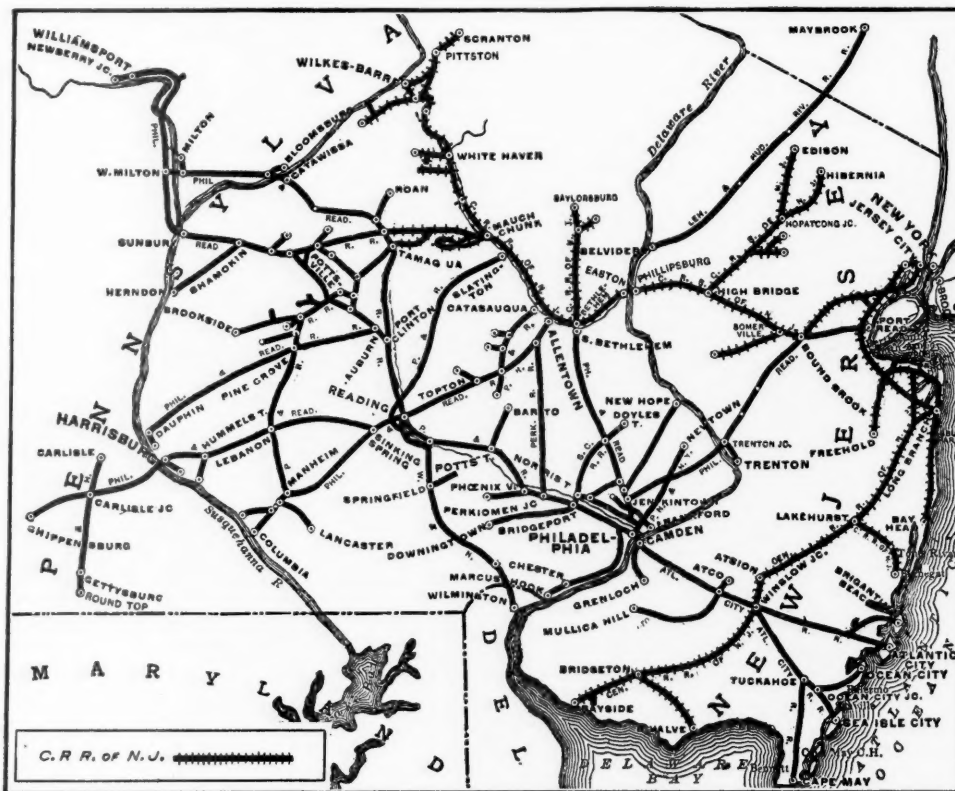
*Deficit.

Central Railroad of New Jersey.

The Central Railroad of New Jersey is a splendid railroad, but its annual reports are among the most unsatisfactory of any issued. They are exceedingly incomplete and also are not clear in all of the facts which they do give. For instance, the operations are divided into two groups, "rail lines" and "other operations including New York & Long Branch Railroad." The first group includes the bulk of the operations, but the second is by no means unimportant, for it adds nearly \$3,000,000 to gross earnings. Yet the operating expenses of the whole property are lumped in one figure. For the rail lines, to be sure, the four operating expense accounts are given separately, but even these do not go into details. Owing to these and many other lacks, it is difficult to review the operations of the road with any accuracy. The best that can be done is to give certain results; some of them stated in the report; some a matter of opinion.

In spite of the fact that only a nominal surplus for the year is shown, it is certain both from the few figures given in the report and from acquaintance with the property that the road is unusually strong both financially and physically. On the "rail lines" there was spent, as nearly as one can tell when no figures of mileage operated are given, \$2,961 per mile for maintenance of way. In 1906 this expense was \$2,683. Besides this on the whole property

\$2,362,062 was charged against income for renewals and improvements made or to be made, making a total charge against income for maintenance of way of at least \$4,280,680, or \$6,606 per mile of line. It is a prosperous railroad which can spend anything like this sum, when most roads get along with from \$1,000 to \$2,000 a mile. Of course the fact that the Central of New Jersey has 263 miles of second and 71 miles of third and fourth tracks—these figures gleaned from the Reading Company's report—must be taken into consideration, but, even so, the expenditures on the line are very high. For lack of the detailed figures of repairs and renewals, it is not possible to work out the unit figures for equipment maintenance. However, including \$1,150,000 appropriated out of income



Reading Company's System.

to the equipment fund, the maintenance of equipment expenditures were enough to provide \$3,000 per locomotive, \$800 per passenger car and \$93 per freight car. These also are high figures. It is evident, therefore, that during the past year the road has been lavishly maintained. And not only last year but for years before has this general policy been followed out.

Gross earnings, including all operations, were \$25,700,000 against \$23,100,000 in 1906, a gain of \$2,600,000, or 12 per cent. Operating expenses increased \$1,400,000, leaving a gain of \$1,200,000 in net earnings. Freight earnings were \$19,400,000, a gain of 12 per cent. over 1906, and passenger earnings \$5,500,000, an increase of 9 per cent. The revenue trainload was 520 tons, about the same as in 1906.

There were 81 miles of track relaid with 90-lb. rails during the year and 61 miles relaid with second-hand rails, chiefly of 70, 80 and 85-lb. section. The improvement of the ferry facilities at the foot of Liberty street, New York, is well under way. Up to July 1 there had been \$172,565 thus spent. In August the Newark Warehouse Company, a subsidiary corporation, opened a large new freight warehouse at Newark, N. J., which was described in the *Railroad Gazette* of August 30, 1907.

One four-wheel switching locomotive, 15 unvestibuled passenger cars, five combination cars, 50 special ore cars, 2,000 steel underframe box cars, 1,000 steel hopper bottom coal cars and 1,000 steel underframe gondola cars were bought during the year. Another 1,000 steel hopper bottom coal cars, these of 100,000 lbs. capacity, and 20 passenger train cars have been ordered for delivery during the present fiscal year.

As the New York passenger entrance of the Philadelphia & Reading and the Baltimore & Ohio, the Central of New Jersey has been brought to a high standard of efficiency. It has the unusual distinction of being popular with its commuting patrons. This is all the more remarkable because their loud praises of its service have followed a period of the bitterest complaint against the suburban working of the road. There could probably be no more sincere tribute to the success of its present managing head. It would be more in accord with the high standard of the road to issue an annual report which really described the operations of the year and the condition of the property.

The mileage of the road is shown in the map of the Reading

Company's system above. The results of the last two years compare as follows:

	1907.	1906.
Mileage worked	648*	648*
Passenger earnings	\$5,510,913	\$5,069,594
Merchandise freight earnings	10,105,662	9,384,015
Coal freight earnings	9,312,268	8,125,685
Gross earnings	25,687,403	23,101,090
Maint. of way and struct.	1,918,618*	1,738,672*
Maint. of equipment	2,755,563*	2,573,495*
Conducting transportation	6,349,755*	5,594,899*
Operating expenses	14,164,118	12,779,867
Net earnings	11,523,285	10,321,223
Income from investments	1,175,653	1,151,197
Fixed charges	6,916,060	5,812,716
Net income	5,782,879	5,659,705
Improvement appropriations	3,512,062	3,373,799
Year's surplus	75,973	91,482

*Not including New York & Long Branch Railroad, which is controlled by the Central of New Jersey and the Pennsylvania jointly, and some other operations.

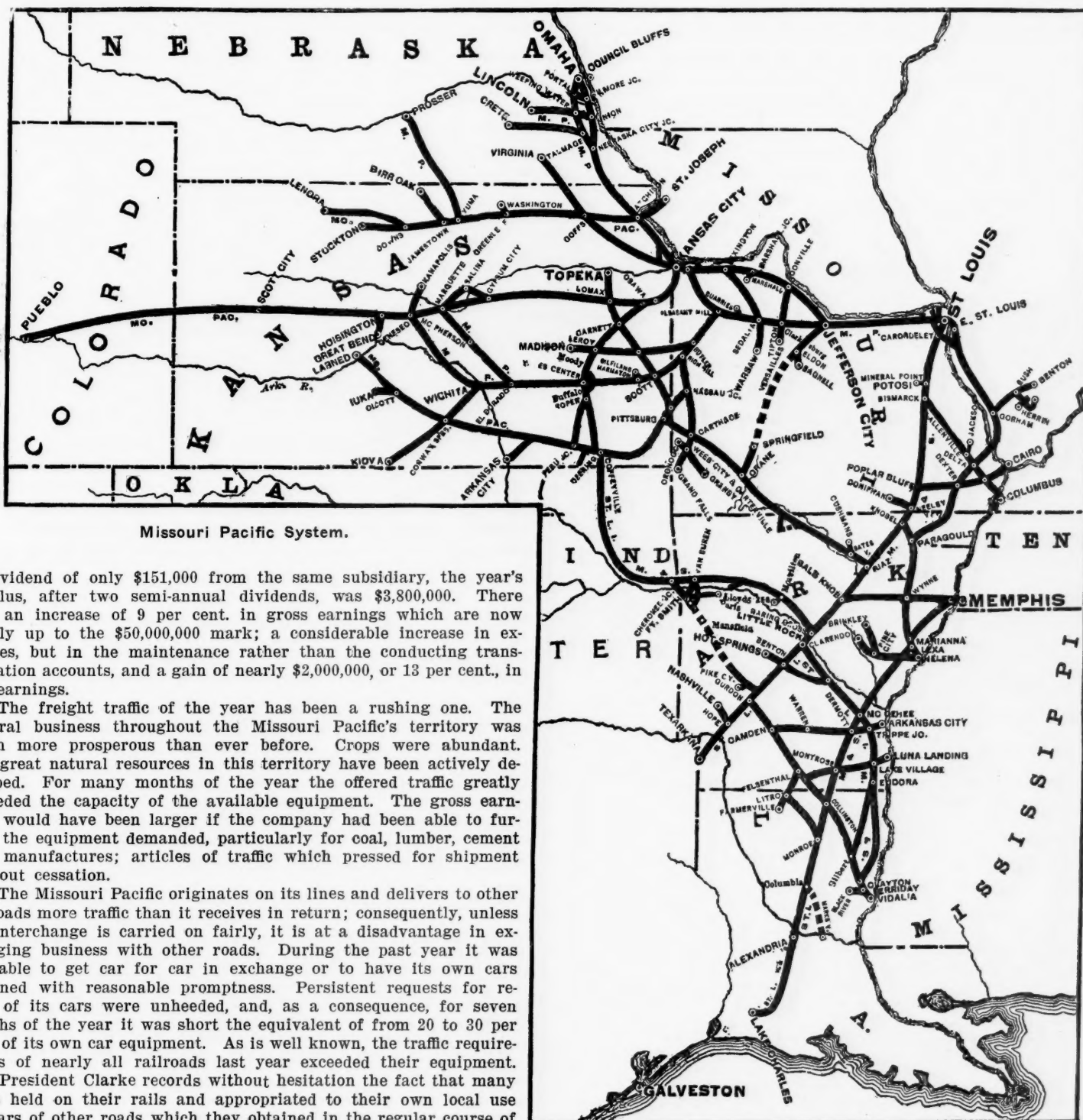
Missouri Pacific.

The Missouri Pacific has had a very prosperous year. In 1906, even after calling on its subsidiary, the Central Branch Railway, for over \$1,000,000 in dividends, it showed a surplus for the year of less than \$500,000. This, however, was largely due to the fact that owing to a change in the fiscal period three semi-annual dividends were charged to the year's income. If only two had been so charged, the 1906 surplus would have stood at nearly \$2,500,000. Last year, with

business—a practice from which the Missouri Pacific seems to have been one of the worst sufferers. He hopes, however, that the per diem charge of 50 cents a day per car and other measures taken will prevent a repetition of this abuse.

Attention is called to the fact that the Missouri Pacific should no longer be considered as depending on the products of the farm. It is true that at least 60 per cent. of its lines run through fertile prairie country, but with last year's crops bordering on the maximum and a full measure of traffic derived from them, agricultural and animal products contributed only 23 per cent. of the total freight revenue, while products of mines, forests and manufactures furnished 77 per cent. There were established on the lines during the year 422 new industries, employing nearly \$20,000,000 of capital. These include 166 lumber plants, 14 coal mines, 19 lead and zinc mines and 43 cement, brick, stone and other plants for manufacturing building material. Cement in particular is an important and growing article of traffic. The whole country's consumption in 1906 was 45,600,000 barrels, against only one-tenth as much ten years earlier. It is not possible to tell how much of this product the Missouri Pacific carries, but it is evident that it is one of its valuable assets from a traffic standpoint.

The passenger revenue was reduced during the last four months of the fiscal year by legislative rate reductions. Two-cent fare laws took effect in Nebraska in March; in Arkansas in April; in Kansas in May, and in Missouri in June, besides in Illinois later. The number of passengers increased 21 per cent., the number of passengers



a dividend of only \$151,000 from the same subsidiary, the year's surplus, after two semi-annual dividends, was \$3,800,000. There was an increase of 9 per cent. in gross earnings which are now nearly up to the \$50,000,000 mark; a considerable increase in expenses, but in the maintenance rather than the conducting transportation accounts, and a gain of nearly \$2,000,000, or 13 per cent., in net earnings.

The freight traffic of the year has been a rushing one. The general business throughout the Missouri Pacific's territory was much more prosperous than ever before. Crops were abundant. The great natural resources in this territory have been actively developed. For many months of the year the offered traffic greatly exceeded the capacity of the available equipment. The gross earnings would have been larger if the company had been able to furnish the equipment demanded, particularly for coal, lumber, cement and manufactures; articles of traffic which pressed for shipment without cessation.

The Missouri Pacific originates on its lines and delivers to other railroads more traffic than it receives in return; consequently, unless car interchange is carried on fairly, it is at a disadvantage in exchanging business with other roads. During the past year it was not able to get car for car in exchange or to have its own cars returned with reasonable promptness. Persistent requests for return of its cars were unheeded, and, as a consequence, for seven months of the year it was short the equivalent of from 20 to 30 per cent. of its own car equipment. As is well known, the traffic requirements of nearly all railroads last year exceeded their equipment. Vice-President Clarke records without hesitation the fact that many roads held on their rails and appropriated to their own local use the cars of other roads which they obtained in the regular course of

carried one mile, 9 per cent. and the passenger earnings, 11 per cent. As the increase in passenger earnings is greater than the increase in passenger miles, it would hardly seem that the result of the lower rates had been severely felt. The report, however, makes the comparison between the passenger earnings and the number of passengers, which increased nearly twice as fast, and implies that this came as a result of the rate reductions. In spite of a large movement of home-seekers to the Southwest, there was a reduction of 10 per cent. in the length of the average passenger trip, which now stands at 46 miles.

Operating expenses as a whole increased 7 per cent. The increase in maintenance of way and structures was 10 per cent., in maintenance of equipment 21 per cent. and in conducting transportation 3 per cent. The small increase in this last group of expenses is notable. In December last a concerted movement of the various organizations in the train service was made for a decrease in hours and an increase in wages. After a protracted conference at Chicago between representatives of the railroads of the West and Southwest and of these various labor organizations, during which both the Chairman of the Interstate Commerce Commission and the Commissioner of Labor intervened to bring about a settlement, a general wage increase of about 10 per cent. was made, taking effect in February and in April. An increase in the wages of yardmen on the Missouri Pacific had been made in November. As a result of these various increases, the wage payments to employees of the transportation department have been increased by about \$625,000 a year. About one-third of this expense only, however, fell on the expenses of the year ended June 30, 1907.

The maintenance of way expenditures per mile operated were \$926, against \$857 in 1906. This figure has of late years shown a steady increase and is now high enough so that it should be about sufficient for maintaining the lines. Whether it provides anything to make up for the smaller expenditures of previous years is not so certain. Part of the larger unit charge represents merely increased cost of material or labor rather than any additional improvement of the lines. The cost of ties, for example, has increased 22 per cent. during the year. The wages of section hands were increased about 20 per cent. during the latter half of the year. As a further fact in this connection, it should be remembered that about half of the Missouri Pacific's track is still unballasted.

The great increase in expenses during the year came in maintenance of equipment. This was partly due to an average increase of 9 per cent. in the wages of employees of the machinery department in force from six to seven months of the year, and partly to a large advance in the cost of materials for repairs. Repairs cost \$3,008 per locomotive, against \$2,840 in 1906; \$746 per freight car, against \$625 in 1906, and \$68 per passenger car, against \$51 in 1906.

The operated mileage was increased by 135 miles, all on the St. Louis, Iron Mountain & Southern's lines. Of this, 34 miles on the Springfield (Mo.) branch was opened April 20, 1907, and 37 miles of the branch from Eudora, Ark., south to Gilbert, La., was opened June 1, 1907. The rest of the increase was made up of new trackage rights over the St. Louis Southwestern from Dexter, Mo., to Paragould, Ark. The Eudora-Gilbert branch, when completed, is to be part of the Gould low-grade line from St. Louis to New Orleans.

President Gould sums up the rate reductions of the year and the general railroad financial situation as follows:

While the passenger business of the year shows an increase of \$942,923, the marked general prosperity in the territory traversed by your lines of railroad would have contributed a larger increase to the revenue from passenger traffic, had it not been for the 2-cent a mile passenger legislation, enacted early this year, by the states of Illinois, Missouri, Arkansas, Kansas, and Nebraska. This low rate, by its application to state business, affects the interstate business as well, and its effects are far-reaching. With the limited volume of local travel in those states, a 2-cent rate is not deemed compensatory for the service rendered.

Adverse legislation affecting train and station operations in Arkansas, Missouri and Kansas, coupled with the general advance in wages of employees and the increased cost of materials and supplies, tends to enlarge cost of operation. Freight rates on certain commodities were reduced in Arkansas, Missouri, Kansas and Nebraska by legislative act and orders of state railroad commissioners, which will have the effect of limiting net revenues. Litigation is now pending in the courts to test the validity of these enactments and orders.

Railroads cannot meet the requirements of the public so long as the adverse wave of sentiment now prevalent throughout the land is directed against them and given concrete expression in the form of drastic laws, which increase their expenses, reduce their revenues and render them incapable of improving their service and enlarging their facilities. It is essential to the industrial progress of the country that the transportation facilities shall not only be maintained, but improved and enlarged. To accomplish this, the railroads

must receive remunerative returns for the services rendered. In this way only can they maintain their credit and that degree of confidence in the financial world that will enable them to command capital for additional facilities to meet the increasing requirements of the great business development now taking place throughout the country. Time will surely show that it is only through fair and reasonable treatment by the state, that the railroad will be enabled to best subserve the public interest.

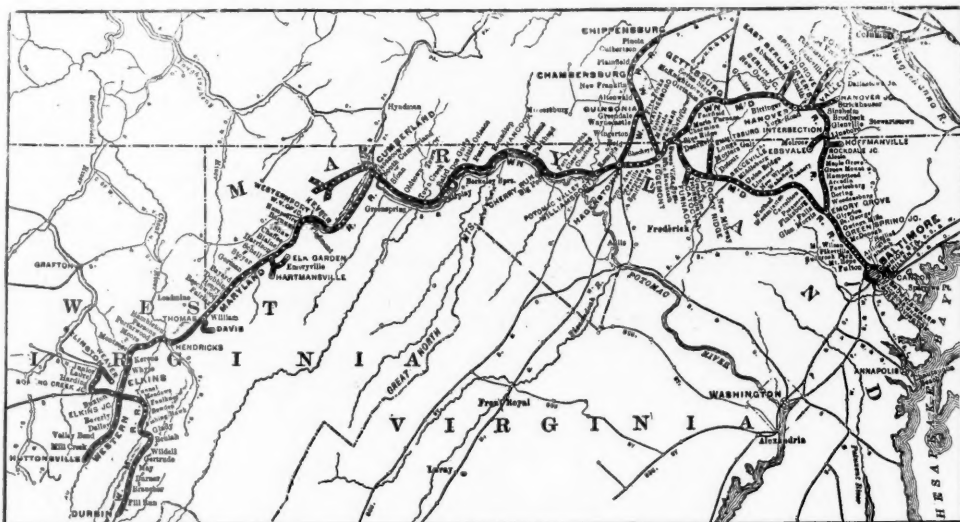
The following table gives the results of operation of the Missouri Pacific, St. Louis, Iron Mountain & Southern and Central Branch for the last two fiscal years:

	1907.	1906.
Mileage worked	6,375	6,276
Passenger earnings	\$9,696,064	\$8,753,141
Freight earnings	35,509,589	32,563,507
Gross earnings	48,703,343	44,566,821
Maint. way and structures	5,906,121	5,378,125
Maint. of equipment	6,998,863	5,781,532
Conducting transportation	17,595,101	17,141,984
Operating expenses	32,515,070	30,282,405
Net earnings	16,188,272	14,284,416
Dividend from Cent. Branch Ry	1,061,900	151,700
Net income	7,698,103	6,329,015
Year's surplus	3,807,228	2,438,140*

*The actual reported surplus was \$492,710, because a third semi-annual dividend of 2½ per cent., amounting to \$1,945,430, was charged to the 1906 income. This was on account of a change in the fiscal year.

Western Maryland.

The first full year of operation of the united lines of this road ended June 30, 1907. During this whole year the connection between the original Western Maryland and the West Virginia Central & Pittsburgh was in operation. The filling in of this gap between Big Pool on the east and Cumberland on the west was of vital importance to the success of the Western Maryland, for the lines



Western Maryland.

west of Cumberland originate large quantities of coal, which find a ready tidewater market at Baltimore. Before the connection was built this traffic had to be sent from one road to the other over the Baltimore & Ohio at large expense. The connecting line, which had to make many crossings of the Potomac river in mountainous country, was costly. It has many tunnels and a large amount of cutting and filling was necessary. On one part of the line whole hillsides were blown out and across the river at one blast to make a place for the grade. Yet in spite of the difficult nature of the country the road was built for economical operation. The connection is 59 miles long, of which 37 miles are tangent, and has maximum gradients of 26.4 feet to the mile westbound, and 15.8 ft. eastbound, which is the important direction of traffic, with a maximum curvature of 6 degrees. It has been in operation for both passenger and freight since June 17, 1906, so that the present report of the Western Maryland covers almost exactly the first full year of its operation.

This new line was financed by a first mortgage bond issue of the expanded Western Maryland. During the past year the fixed charges resulting from the large capital expenditures for this and other improvements were in full operation, while the advantages of these improvements were only beginning to show. In the first half of the fiscal year the net earnings did not keep pace with the rapid increase of fixed charges, though they did overtake these charges in the latter part of the year. As a result, the net income was only \$11,000, against \$252,000 in the previous year. During the first quarter of the present fiscal year, however, there has been no further advance in fixed charges, while earnings have continued to grow, so that for the three months ended September 30, 1907, the estimated net income over the proportion of fixed charges applicable to that quarter was \$82,000.

There was an increase of 17 per cent. in gross earnings, though the increase in gross per mile was only 8 per cent. Net earnings, however, increased only 10 per cent., and per mile, 4 per cent. This

relatively smaller increase in net is a result of a number of different causes, particularly the increased costs and traffic congestion resulting both from difficult weather conditions and from the disturbances and interruptions caused by the various physical improvements which were under way in the first half of the fiscal year. At the beginning of the year these disadvantages were particularly strong because of the company's inability to secure free interchange of equipment with connecting lines. By the close of the year, however, most of the construction work was finished and there was in general a marked improvement in these operating features.

As the plan of the Gould interests to connect the Western Maryland with the Wabash-Pittsburgh Terminal or the Wheeling & Lake Erie, so as to make it the eastern end and Atlantic tidewater outlet of the various Gould railroads throughout the country, appears to be for the time being in abeyance, the Western Maryland must for the present be considered purely on its own merits as a local road. As such, its prosperity depends largely on coal traffic. Last year, with the two parts of the system united, there was a much larger volume of coal and coke tonnage. The total handled at the Port Covington (Baltimore) piers was just under 500,000 tons. During the present year there are to be, based on existing contracts, 900,000 tons thus shipped. The total bituminous coal tonnage carried was 2,941,847 tons, against 1,684,171 tons in 1906. Coal and coke together contributed 58 per cent. of the total tonnage, as against 47 per cent. last year; and 41 per cent. of the 1907 gross earnings. The company is now securing a longer haul on its coal traffic, fuller use of its large terminal facilities, and more active and profitable movement of its equipment. The number of miles run daily by the average system car on the home road increased from 15 to 19 miles, or 27 per cent., during the year. Between June 30, 1907, and October 16, 1907, there was a further increase of

available outlet through the Cumberland Narrows for the shortest connection of the Western Maryland with Pittsburgh and the West.

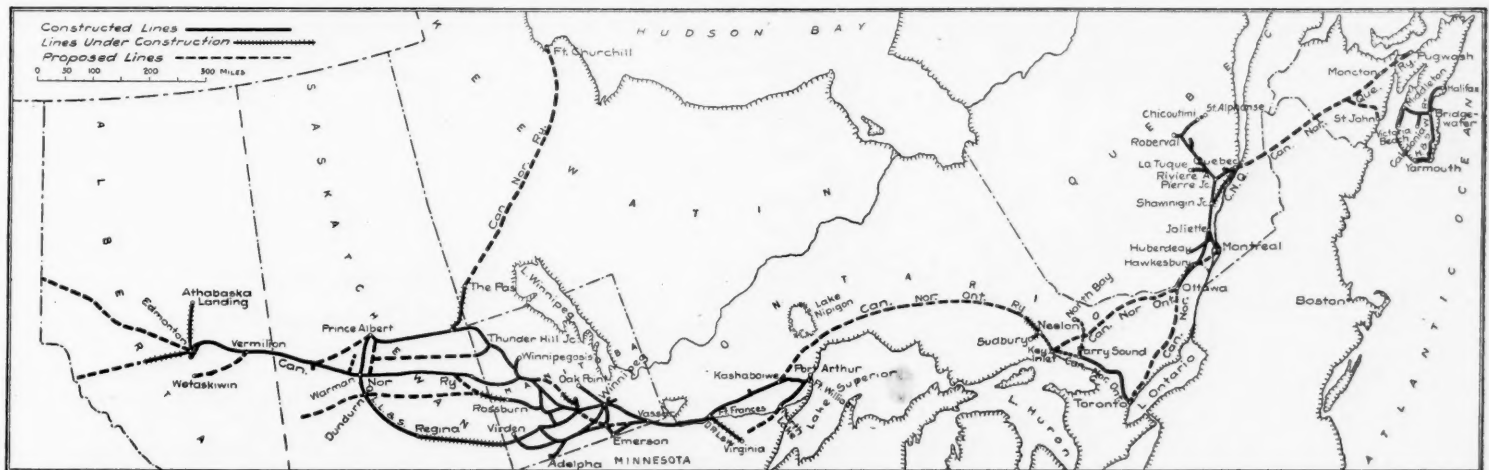
The following table summarizes the results:

	1907.	1906.
Mileage worked	543	544
Passenger earnings	\$898,575	\$876,426
Freight earnings	4,387,206	3,606,087
Gross earnings	5,600,455	4,802,094
Maint. way and structures	609,025	497,478
Maint. of equipment	720,588	595,371
Conducting transportation	2,101,633	1,761,933
Operating expenses	3,581,328	2,995,611
Net earnings	2,019,127	1,806,483
Net income	10,964	251,509

Canadian Northern.

The Canadian Northern is still rapidly expanding. In spite of a winter which, according to the report, was the severest ever known in western Canada, the road has progressed during the last year not only in mileage and in earnings, but in net earnings per mile. Gross earnings per mile of road were \$3,328, a gain of 16 per cent. over the previous year, while operating expenses per mile rose 21 per cent., leaving net earnings of \$1,166 per mile, an increase of 8 per cent. over the previous year. The year's record is specially interesting, first, because it shows growth in every feature and, second, because the circumstances of the year's operation are fully and interestingly discussed in the report.

From the last of November, 1906, to the first of April, 1907, the operating department had to devote itself to keeping the lines open. During this period, therefore, the traffic did not earn expenses. There was continuous low temperature with deep snow, and, on the whole, an extraordinary winter. President Mackenzie says that while the extremely rapid development of the road and the unexampled growth



Canadian Northern System.

3 miles. This makes an increase of 47 per cent. in car movement during the 15 months. The train load, which is not given in the report, was 371 tons, against 354 tons in 1906. Owing in particular to the increased coal traffic, total freight earnings increased 22 per cent.

There was a total of \$4,691,957 of capital expenditure during the year. Of this amount \$1,400,000 was for main line improvements, \$1,300,000 for new equipment, and \$214,000 for the coal department. Under the first item \$556,000 was spent in double-tracking between Baltimore and Emory Grove. The main line between Big Pool and North Williamsport, 13 miles, which adjoins the Cumberland extension on the east, has been revised. There have also been considerable improvements on the Gettysburg line, which has lower eastbound grades than the main line via Rocky Ridge, and over which most of the tidewater coal is to be handled. When the double-tracking from Emory Grove to Baltimore is finished there will be what amounts to a double track from Baltimore to the junction of the Gettysburg and the main lines at Highfield.

The average weight of rail in main and second track (34 miles of the latter) was 78.4 lbs. to the yard on June 30, 1907, against 76.8 lbs. to the yard a year earlier. The average weight of rail on the main line from Baltimore, Md., to Elkins, W. Va., is 87 lbs. to the yard. Of the 574 miles of main and second track, 403 have stone ballast. Maintenance of way and structures cost \$1,027 per mile, against \$1,028 in 1906.

During the year the George's Creek & Cumberland Railroad was bought at a cost of \$1,816,307. This is a self-supporting local road, 33 miles long, from Cumberland north to the Pennsylvania state line and southwest through the George's Creek coal region. It is valuable to the Western Maryland both because it contributes a large and profitable traffic, because its terminal facilities supplement the Western Maryland's, and furthermore, and this, perhaps, the deciding reason for its purchase, because it affords the only

of traffic have made necessary the addition of new equipment as fast as possible, the delays of last winter were primarily due to weather conditions and not to equipment shortage. He also feels that the fertility of the soil of the Canadian Northwest and the character of the climate have been put to an extreme test, and the company having come through successfully, the future can be regarded with every confidence. But the road is in need of much. In Manitoba, Saskatchewan and Alberta much equipment of all kinds and other means for handling business faster must be provided. New lines are under construction to meet the demands of farmers who are already producing quantities of grain which will soon be ready for shipment. Other lines are planned not only to serve new localities, but as feeders to protect the enormous revenue-producing areas opened up by the Canadian Northern. The development of new districts during the past year has required considerable expenditures on structural and mechanical improvements. Roadbed has been ballasted, many new stations have been built, new sidings laid, engine houses at division points improved, coal handling plants installed and water stations increased and enlarged. Besides erection of freight sheds in many towns, there have been new freight accommodations built at Port Arthur in particular; stock yards have been built at various points. That much remains to be done, however, is shown by the maintenance of way expenditure per mile of road, which was \$490, against \$391 in 1906 and \$351 in 1905. These sums are much too small even in prairie country to keep a road in good condition.

Over \$3,000,000 has been collected and \$4,871,000 more is due from lands sold. Against this there are \$2,000,000 land grant bonds outstanding. The company also controls the Canadian Northern Prairie Lands Company, an investment which shows a profit. There are still 1,828,251 acres of land unsold. In regard to immigration from the United States, President Mackenzie speaks thus frankly:

"While it is especially gratifying to your directors that the

company's lands have proved so attractive to settlers from the Middle and Western States, because they are thoroughly experienced in prairie farming, and, besides, being good judges of land, bring it rapidly into cultivation and thus create traffic for the railroad, it is more desirable than ever to encourage the immigration of families of good British stock. The Dominion government is doing admirable work in this direction, and a large proportion of the arrivals of recent years are settled near your railroad."

Special attention is called to the increased value of the road's terminals at important points in the Canadian Northwest. There has been a general land boom in that territory, but terminal property is least likely to suffer from a reaction.

The new iron ore traffic from the Atikokan (Ontario) mines to Port Arthur, referred to in the report of a year ago, has begun. The new blast furnaces at Port Arthur have since July been producing good grade pig iron. It is understood that the output of these furnaces is to be doubled, with the idea of establishing steel works at Port Arthur and supplying the western market from that point. The iron ranges tapped by the main line west of Port Arthur lie north of and are similar to those in the northern part of Minnesota, which have proved so rich in both quality and extent, and it is believed that the movement of ore from the Atikokan and Mattawin ranges will ultimately be a source of great profit.

Port Arthur and Fort William, the ports on Lake Superior, are still expanding, and new industries have been established there. The Canadian Northern coal docks at these points are capable of handling 600,000 tons a season, and so expeditiously as to effect a considerable saving in the cost of water-borne fuel for which the demand in the western provinces is increasing enormously year by year. Direct water connection was established during the year between these ports and Parry sound on Georgian bay, whence a line of the Canadian Northern Ontario runs south to Toronto. This has already begun to carry a large amount of profitable traffic to and from the West. Thus, in addition to the agricultural possibilities on which the road has heretofore had almost its whole dependence, other traffic is springing up and through routes are being developed.

With an increase of 22 per cent. in the average mileage operated, passenger earnings increased 45 per cent. and freight earnings 32 per cent. The principal increases in freight traffic were in flour, grain, logs and lumber, and immigrants' effects. This last item increased from 2,614 cars in 1906 to 4,647 cars in 1907, a gain of over 75 per cent., which vividly suggests the rapid settling of the Canadian Northern's territory. The traffic in both live stock and in firewood fell off sharply.

There were 190 locomotives on June 30, 1907, as compared with 141 a year earlier. In the same period the sleeping and dining cars increased from 18 to 29, passenger cars from 77 to 108, other passenger train cars from 35 to 48, cabooses from 69 to 97, work cars from 83 to 123 and freight cars from 5,437 to 6,868.

The principal extensions during the year were in Manitoba and Alberta. An important addition to the system in the East was the Quebec & Lake St. John, which added a valuable piece of railroad to the Canadian Northern Quebec, for which it previously furnished a Quebec entrance. As shown by the map, however, a cut off is proposed which will considerably shorten the route from Montreal to Quebec.

The following table summarizes the results of the last two years' operations. It shows the rapid growth of the road:

	1907.	1906.
Mileage worked	2,509	2,064
Mileage June 30	2,639	2,482
Passenger earnings	\$1,464,256	\$1,062,639
Freight earnings	5,741,729	4,335,933
Mail earnings	58,231	23,172
Express earnings	85,124	53,941
Miscellaneous earnings ..	1,000,858	428,070
Gross earnings	8,350,198	5,903,756
Maint. way and structures ..	1,228,957	807,692
Maint. of equipment	852,800	585,602
Conducting transportation ..	3,097,495	2,072,057
General expenses	244,912	209,382
Operating expenses	5,424,164	3,674,733
Net earnings	2,926,034	2,229,023
Net income	1,043,545	719,574

NEW PUBLICATIONS.

Railway Corporations as Public Servants. By Henry S. Haines, M. Am. Soc. C. E., M. Am. Soc. M. E., ex-President of the American Railway Association. The Macmillan Co., New York, 1907. 233 pages; 5x7 1/4 in.; cloth. \$1.50.

This work contains the substance of a course of lectures delivered in May, 1907, at the Boston University of Law, and to a certain extent supplements the author's previous book on Restrictive Railway Legislation. Mr. Haines expresses his aim as an effort to better the existing relations between railroad corporations and the public whom they serve, and the book at hand is well adapted to this purpose. Dealing first with the nature of public service, then with the public service done by railroads, and by the public benefits which they confer, he follows the line of gradual evolution, and shows the

commercial needs that required railroad transportation and the way in which these needs were met.

After the period of early necessity came the period of the promoter and of needy and bankrupt companies, with reorganizations and a general tightening of charter privileges. Then followed the years of unrestricted competition, with discrimination between communities accompanied by a further discrimination between individuals, heightening public indignation in the non-competitive regions, and making new enemies in the competitive regions of shippers who were suffering from this secret discrimination. Meantime, net revenues were being depleted, and by the beginning of the decade of 1880, over one-fourth of the country's railroad mileage was in receivers' hands.

Mr. Haines describes the decade of 1880-1890 as the renaissance of the railroad system in the United States; a period of dissolution followed by reorganization and rebuilding. But railroad managers had now learned the cost of free competition, and began to protect themselves by consolidation. This consolidation and its results, together with a mingling, in legislative enactments, of the results of all the woes and griefs, real and fancied, which shippers had derived from conditions past and present, constitutes the basis of the present situation. Mr. Haines discusses in detail the aims and motives of the original Act to Regulate Commerce and of subsequent additions, including the crude and hasty Sherman Act, and shows clearly some of the evil conditions which this legislation, together with the Elkins Act and the revised commerce Act of 1906, was aimed to remedy.

The latter part of the book deals with the complex questions of present-day inequalities in law and in service; of "reasonable" rates, the effect of ineffectual control, and the standards of railroad service. In these chapters Mr. Haines has handled a matter of much difficulty with clearness and in a conservative and fair spirit, and his book deserves recognition as an excellent picture of conditions old and new, with helpful suggestions for the future. His suggestion that the Interstate Commerce Commission should co-operate with the American Railway Association and draw upon the full store of technical knowledge in the possession of that body, strikes us as excellent.

CONTRIBUTIONS

Firing Stationary Boilers.

Norfolk, Va., Oct. 24, 1907.

TO THE EDITOR OF THE RAILROAD GAZETTE:

"There is vastly more difference between a good fireman and a bad fireman than between a mechanical stoker and a good fireman."

"Economy of boiler management is dependent upon the skilful handling of the fuel. The fireman can save more to the plant than anyone else."

"Improper firing is probably the most common cause of the poor economy of boilers. For every ton of coal burned we throw away nearly 7 1/2 tons, losing 88 per cent."

These conclusions have been reached by three of the best-known authorities on steam engineering in the country, Professors Thurston, Hollis and Kent, and it is probable that no one will dispute their truth and accuracy. Is it not time for us to give more attention and thought to improving the work of the fireman?

The technical papers and magazines are very much exercised at present over the great waste of our coal supplies. The President has taken a hand in the matter and the United States Geological Survey people are crying out over it. Even the daily papers are printing interviews on the subject. But in all the articles that have appeared on the subject, both in the technical and daily press and in the Geological Survey papers, very little, if anything, has been said about the question of improving the work of the firemen.

Improvements are made and suggested in boilers and combustion methods and appliances, etc., but apparently no thought is given to the man who has the most to do with making such improvements successful. A poor, careless or ignorant workman will never do a good job even with the best tools.

Most people seem to think that anyone with enough physical strength will answer as a fireman, that it is just ordinary manual labor and requires no special skill or aptitude or intelligence. Now the writer believes, knows that the first-class, skilful fireman, like a true poet or musician, is born and cannot be made. There is just as much difference between the best fireman and the average one as there is between Robert Browning and the average rhyme-maker, or between Beethoven and the modern comic opera composers.

We have often seen men who have been firemen for eight or ten years that did not know the first principles of proper firing, and, working alongside of them, others who had been firing only a few months, doing much better work and burning less coal.

It is of great importance to us, as a nation, that prompt and

efficient steps be taken to bring up the average of efficiency of the men who burn our coal. The immense increase in the amount of coal used by the country during the last few years has called the attention of our technical men to the absolute necessity for taking effective and immediate steps to get a greater amount of work out of a pound of coal.

But so far these steps have been nearly altogether in the direction of improving the appliances for burning coal and turning the heat into effective work.

Along these lines the United States Geological Survey has done and is doing most effective work, which, however, is not so well known as it should be.

As far as the writer knows, however, there has been no concerted or comprehensive attempt on the part of any government body or engineering society to increase the efficiency of the fireman, the man who handles all the improved appliances and on whose skill and work a large amount of their success depends. The railroads, it is true, make spasmodic attempts to give their firemen instructions in combustion and firing, and the average intelligence and skill of the locomotive fireman are above those of the stationary fireman. This, however, is largely due to the better pay, more interesting work and better chances for promotion given the former. A good locomotive fireman can fire stationary boilers very readily, but it takes the stationary fireman some time to keep up steam on a locomotive. In other countries, notably in Germany, there is much more practical interest taken in improving the firemen. The German government includes a course of lectures on fuel and its combustion in its educational curriculum, and gives a sum annually to lecturers and instructors to boiler firemen. In many cities of German schools for their training are established. These schools give two weeks' instruction for the sum of \$3.

The writer has had numerous opportunities of seeing the work of boiler firemen in other countries, and has no hesitation in saying the average fireman in many of them does much better work in handling coal than in our country. This is especially true of Chile and Mexico, countries that we are rather inclined to look down upon. Of all the stationary-boiler firemen he has seen, the best was a Finnlander and the next best a Mexican.

This condition of things in the United States is almost entirely due to the steam-plant owners and to the low price of coal as compared with that in other countries. As stated elsewhere by the writer (see *Black Diamond*, Oct. 5, 1907), it is believed to be a conservative estimate that, at the average hand-fired steam-plant in the country, at least 5 per cent. of the coal used could be saved by possible improvements in firing methods alone. At many plants this amount could be doubled.

Actual tests have shown that there may be a difference of 20 per cent. in evaporation as between two firemen under the same conditions, with the same boiler and same quality of coal.

What we need in this country to improve efficiency of our boiler-plants, is education and instruction for the firemen and the steam-plant owners. We can't get the best results from our automatic stokers and other appliances for saving fuel unless we have intelligence and knowledge to handle them. We can't do more work with a pound of coal unless the men who burn the coal are shown how to do better work themselves and are given some incentive to improve themselves.

Increased knowledge on the part of the firemen and increased attention to their work would surely lead to improvements in the steam-plants, which would add still further to the savings to be effected. In many parts of the country the low wages paid and the long hours of work will not attract young men of intelligence to the hard task of boiler firing. This is a matter that must be remedied gradually, but that it must and will be remedied is apparent to anyone who has given it attention.

The steam-plant owner must decide between low wages and high fuel and repair bills and low efficiencies or good wages, lower bills and more uniform steam pressure and longer life of his boiler plant.

The whole question comes to this, that if we want to increase the length of time that our unused coal supplies will last, we must take practical and concerted steps to add to the efficiency of the men who burn our coal, not only by giving them improved appliances of every kind, but also by increasing their knowledge of combustion.

This can be done by instruction, both practical and theoretical, by showing an increased interest in their work and by giving them better pay and shorter hours and by making the boiler rooms more comfortable places to work in. The writer has in mind boiler rooms (and they are not so exceptional, either) that are not fit for a self-respecting man to work in.

Prof. William Kent says in his "Steam-Boiler Economy" that all kinds of hand firing with ordinary furnaces are improper. Some kinds are worse than others, but all are bad.

The writer believes that, given a first-class fireman and up-to-date tools and appliances, together with close attention on the part of the chief engineer or manager to the handling of the coal, automatic stokers will give no better results. This, of course, does

not include the saving of labor at large plants due to the use of stokers.

Considerable prominence has been given recently in the papers to a letter and order of the President withdrawing from settlement a large amount of undeveloped coal lands belonging to the Federal Government in the West, with the object of protecting our coal reserves from waste. The suggestion has been made by the writer in another place (see editorial, *Black Diamond*, Oct. 19, 1907), and is now repeated, that the present wasteful methods of burning coal could be greatly improved on and our coal be made to last longer, if instructions and object lessons in combustion and firing should be given by competent men to firemen all over the country. These instructors should be under the direction of the United States Geological Survey. Such a method would be similar to that now in use by the United States Agricultural Department, and of some of the states, giving instructions to farmers in the best methods of farming.

A board of experts, who should be able to practice what they would preach, appointed by the Geological Survey, should be at the service of every steam-plant owner in the country, and their work could be made of great value along the lines indicated above.

Take the conditions that now exist at many smaller boiler plants. The boilers are overloaded, worked day and night without proper cleaning, cheap and badly designed grates are used, the boiler settings and arches are allowed to crack and remain so, and the bridge walls and side walls stay clinkered and choked up. No attention is paid to the ventilation, cleanliness or comfort of the boiler-rooms, and little or no attempt is made to keep accurate records of the coal used each day. The fireman is generally allowed to do as he pleases in regard to firing and water feeding, and as long as sufficient steam is kept up to run the plant, nothing is said to him. The "boss" walks through the boiler-room possibly once a day or more often once a week, satisfied if the machinery is running at its usual speed, and he sees the firemen working. The fireman is paid about the same as an ordinary laborer and works from 10 to 13 hours a day, or even longer; cleaning the fires from once to four times a day, after wheeling out ashes and bringing in coal himself.

At a plant of this kind, and there are a good many of them, it would really seem as though the "boss" should be the one to be instructed and taught the first principles of economy and efficiency in operating a steam-plant.

F. R. WADLEIGH,

Chief Inspector, Castner, Curran & Bullitt.

Railroad Law in August.

The following abstracts cover the principal decisions in the Federal courts:

Discrimination in distribution of cars.—A rule of a railroad company in distributing coal cars for use between mine operators on its lines in times of shortage of cars not to charge against a mine as part of its quota the cars of other railroad companies for carrying coal bought by them for their own use does not amount to an undue advantage in violation of Section 3 of the Interstate Commerce Act particularly where the coal so carried is not taken into consideration in computing the mine's percentage. And this would be the rule in the case of coal purchased by any buyer for its own use to be delivered into its own cars at the mine and which does not become a subject of interstate commerce. Neither is the statute violated by the allowance by the railroad company of an extra percentage of cars to an operator which during the preceding month has unloaded and returned its cars within a certain average time; this practice having been adopted instead of charging demurrage to encourage prompt return of the car and to enlarge the available supply of cars. *United States v. Baltimore & Ohio Railroad Co.*, 154 Fed. Rep. 108.

Contributory negligence of licensee on track.—A person using a railroad track as a footpath is guilty of contributory negligence where at the approach of a locomotive he steps to the side of the track but not at a sufficient distance to avoid being struck by the bucking beam of the engine pilot, and hence he cannot recover damages for injuries thus received. *Delaware & Hudson Railroad Co. v. Wilkins*, 153 Fed. Rep. 845.

Jurisdiction of Federal Courts in cases of discrimination.—A shipper cannot maintain an action in the Federal courts against an interstate carrier for damages because of a discrimination in rates where he does not allege that the charge complained of was not in accordance with a schedule of rates duly published and filed with the Interstate Commerce Commission or that any application had been made to the commission to correct such alleged discrimination. Neither can he litigate the matter in the Federal courts under the \$2,000 clause by including in his demand a claim for damages which he cannot recover and without which the demand is less than \$2,000. *Clement v. Louisville & Nashville Railroad Co.*, 153 Fed. Rep. 979.

Right of insurance company to sue for fire loss.—The Circuit Court for the Western District of Louisiana holds that an insurance company which has paid a loss to the owners of cotton de-

stroyed by fire set out by a railroad company may sue the railroad company for such loss in place of the owner. On the trial the railroad company is entitled to invoke the same defenses that it could against the owner. *Svea Insurance Co. v. Vicksburg & Shreveport Railway Co.*, 153 Fed. Rep. 774.

Safety appliance law.—The safety appliance law makes a railroad company liable unconditionally for its violation and hence in an action for the penalties imposed by the act it is not necessary for the plaintiff to allege and prove that the railroad company did not use due care or ordinary diligence in making an inspection or in repairing such defects as the inspection would have disclosed. *United States v. Atlantic Coast Line Railroad Co.*, 153 Fed. Rep. 918.

Removal of causes.—The Circuit Court of the Southern district of New York in a suit by a stockholder to have stock and bonds issued by a railroad company, to be exchanged for a prior issue of bonds, to be declared beyond the power of the company and void, holds that the company is the only necessary party defendant, and the fact that the directors or persons interested in the bonds to be issued have been joined as defendants will not prevent a removal

Curve and Switch Tables.

The tables reproduced herewith were compiled under the direction of Everett B. Wilson, M. Am. Soc. C. E., in connection with the design and construction of several extensive yard and track schemes. They will doubtless be found very helpful to other engineers on similar work.

It is not expected that they will be generally applicable in their present shape, inasmuch as the "practical leads" and "slip switch lengths" are based on Pennsylvania Railroad standards, but the work of adapting them to the needs of a particular road involves merely the changing of the "SL," "PrL" and "SS" columns to conform with the standards of that road. Copies of these tables as here shown, also copies with these columns left blank, printed on tough paper for "tipping" into hand-books, or for drafting table use, can be had for the asking. Mr. Wilson is now Secretary-Treasurer of The American Bureau of Inspection and Tests, Monadnock Block, Chicago. The following explanations for using the tables are given by the author.

TABLE I

DEG.	RAD.	CURVE NO.	DEG.	RAD.	CURVE NO.	DEG.	RAD.	CURVE NO.	DEG.	RAD.	CURVE NO.	DEG.	RAD.	CURVE NO.
0° 8'	42972	400	1° 00'	5730	275	1° 10'	7300	230	1° 20'	955	24	1° 30'	1200	478
0° 9'	38197	375	1° 02'	5545	275	1° 12'	7045	230	1° 22'	950	24	1° 32'	1229	460
0° 10'	34377	350	1° 04'	5209	275	1° 14'	6515	230	1° 24'	940	47	1° 34'	1250	442
0° 11'	31252	325	1° 06'	4982	250	1° 16'	6000	200	1° 26'	920	23	1° 36'	1271	420
0° 12'	28648	275	1° 08'	4775	225	1° 18'	5500	190	1° 28'	900	45	1° 38'	1293	400
0° 14'	24555	250	1° 10'	4575	200	1° 20'	5000	170	1° 30'	880	22	1° 40'	1315	380
0° 15'	22918	225	1° 12'	4380	175	1° 22'	4500	150	1° 32'	860	21	1° 42'	1338	360
0° 17'	20222	200	1° 14'	4195	150	1° 24'	4000	130	1° 34'	840	20	1° 44'	1361	340
0° 18'	19099	190	1° 16'	4020	125	1° 26'	3800	110	1° 36'	820	19	1° 46'	1385	320
0° 19'	18093	180	1° 18'	3855	100	1° 28'	3600	90	1° 38'	800	18	1° 48'	1409	300
0° 20'	17189	170	1° 20'	3697	75	1° 30'	3400	70	1° 40'	780	17	1° 50'	1434	280
0° 21'	16370	160	1° 22'	3545	50	1° 32'	3200	45	1° 42'	760	16	1° 52'	1459	260
0° 23'	14947	150	1° 24'	3397	25	1° 34'	3000	20	1° 44'	740	15	1° 54'	1484	240
0° 24'	14324	140	1° 26'	3252	10	1° 36'	2800	10	1° 46'	720	14	1° 56'	1509	220
0° 26'	13222	130	1° 28'	3110	5	1° 38'	2600	5	1° 48'	700	13	1° 58'	1534	200
0° 28'	12278	120	1° 30'	2970	2	1° 40'	2400	2	1° 50'	680	12	2° 00'	1559	180
0° 30'	11459	110	1° 32'	2835	1	1° 42'	2200	1	1° 52'	660	11	2° 02'	1584	160
0° 31'	11090	100	1° 34'	2705	0	1° 44'	2000	0	1° 54'	640	10	2° 04'	1609	140
0° 34'	10111	90	1° 36'	2575	0	1° 46'	1800	0	1° 56'	620	9	2° 06'	1634	120
0° 38'	9047	80	1° 38'	2445	0	1° 48'	1600	0	1° 58'	600	8	2° 08'	1659	100
0° 40'	8594	75	1° 40'	2320	0	1° 50'	1400	0	2° 00'	580	7	2° 10'	1684	80
0° 43'	7995	70	1° 42'	2200	0	1° 52'	1200	0	2° 02'	560	6	2° 12'	1709	60
0° 45'	7639	65	1° 44'	2085	0	1° 54'	1000	0	2° 04'	540	5	2° 14'	1734	40
0° 46'	7473	60	1° 46'	1975	0	1° 56'	900	0	2° 06'	520	4	2° 16'	1759	20
0° 48'	7162	55	1° 48'	1870	0	1° 58'	800	0	2° 08'	500	3	2° 18'	1784	0
0° 49'	7016	50	1° 50'	1770	0	2° 00'	700	0	2° 10'	480	2	2° 20'	1809	0
0° 50'	6876	45	1° 52'	1675	0	2° 02'	600	0	2° 12'	460	1	2° 22'	1834	0
0° 53'	6486	40	1° 54'	1585	0	2° 04'	500	0	2° 14'	440	0	2° 24'	1859	0
0° 57'	6031	35	1° 56'	1500	0	2° 06'	400	0	2° 16'	420	0	2° 26'	1884	0

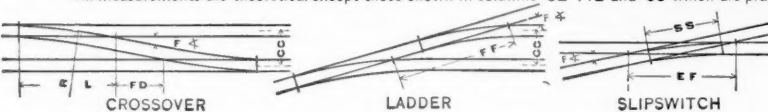
TABLE II

TURNOUTS, CROSSOVERS, LADDERS and SLIP SWITCHES

GAGE 4'-8 1/2" = 47.083'

FROG NO.	CURVE NO.			THEORET'L TURNOUT			PRAC. TURNOUT		FROG ANGLE	CR. OVER FROG DIST.				LADDER FROG DIST.				SLIP SWITCH			FROG NO.
	20'-1"	40'-1"	100'-1"	DEG.	RAD.	LEAD	SWITCH	LEAD		CENT. TO CENT. OF TRKS	12'-0"	13'-0"	15'-0"	12'-2"	CENT. TO CENT. YARD TRACKS	12'-0"	13'-0"	15'-0"	12'-2"	SP&SF	
4	7	3	1 1/2	38°09'	153.0	37.7	10	38.0	14°15'	12°-0"	13°-0"	15°-0"	12'-2"	12°-0"	13°-0"	15°-0"	12'-2"	SP&SF	FP&FP	4	4
5	12	6	2 1/2	24°17'	237.8	47.1			11°25'	12.3	17.5	27.2	13.1								5
6	17	8 1/2	3 1/2	16°51'	341.4	56.5	10	55.0	9°32'	15.0	20.9	32.9	16.0	72.45	78.49	90.57	73.46	38.6	56.5	5	6
7	23	12	4 1/2	12°23'	463.7	65.9			8°10'	17.6	24.6	38.5	18.8	84.48	91.52	105.60	85.65	44.9	65.9	7	7
8	30	15	6	9°29'	605.0	75.3	13	70.0	7°09'	20.3	28.3	44.2	21.6	96.41	104.44	120.50	97.75	51.3	75.3	8	8
9	38	19	7 1/2	7°30'	765.1	84.7			6°22'	22.9	31.9	49.8	24.4	108.21	117.23	135.27	109.71	57.8	84.8	9	9
10	47	24	9 1/2	6°04'	944.0	94.2	18	85.0	5°43'	25.6	35.6	55.5	27.3	120.47	130.51	150.59	122.14	64.3	94.2	10	10
11	55	29	11	5°01'	1141.7	103.6			5°12'	28.2	39.2	61.1	30.0	132.40	143.43	165.50	134.24	70.6	103.6	11	11
12	70	34	14	4°13'	1358.4	113.0	30	96.0	4°46'	30.8	42.8	66.6	32.8								12
15	110	55	21	2°42'	2121.1	141.3	30	120.0	3°49'	38.6	53.6	83.5	41.1	L = 2GN R = 2GN ² / ₂ FD = CC - 2GN (Approx)				77.2	113.0	12	
20	190	95	38	1°31'	3769.0	188.3	30	155.0	2°52'	51.5	71.5	111.4	54.8	N = No. of Frog L = Theor. Lead G = Gage						20	20
24	275	140	55	1°03'	5426.4	226.0	30	175.0	2°23'	62.0	86.0	134.0	66.0	R = Radius CC = Cent. to Cent. of Tracks						24	24

All measurements are theoretical except those shown in columns SL, PrL and SS which are practical being based on Penna. R. R. Cos. Standards



Degrees of Curve, Radii and Curve Numbers for Plotting Railroad Track Work.

of the cause to the Federal courts if the citizenship of the person instituting the action and the company are diverse. *Palitz v. Wabash Railroad Co.*, 153 Fed. Rep. 941.

Indictment for failure to make switch connections.—An indictment of a railroad company for refusal to make switch connections where these facilities are furnished to other shippers is defective unless it charges that the connections demanded are reasonably practicable and could be put in with safety and the business of the shipper would justify the expense of their construction and maintenance. It should also aver that the shipper making the demand offered to pay such portion of the cost as is usual and reasonable. *United States v. Baltimore & Ohio R. R. Co.*, 153 Fed. Rep. 997.

Reconsignment charges.—The Circuit Court of Appeals of the Seventh Circuit holds that an additional charge by carriers of two cents per hundred weight for the privilege of reconsigning hay from the northwest at St. Louis and shipped into southeastern territory was excessive under the Interstate Commerce Act, and that a rate of one cent per hundred weight as found by the commission was reasonable. *Southern Railway Co. v. St. Louis Hay & Grain Co.*, 153 Fed. Rep. 728.

TABLE I.

Railroad Curves.

This table is for use in plotting railroad curves and switch work, and can also be used by interpolating, to a limited extent, for ascertaining the degree of curvature for a given radius, or vice versa. The curve numbers shown are the numbers of curves (for plotting) and are equal to the radii of the same in inches—this system of numbering being best adapted to general uses. Should any other scale be desired, a multiple of one of those shown can be used.

TABLE II.

Turnouts, Crossovers, Ladders and Slip Switches.

The three "Curve No." columns are on the same basis as Table I. and are to be used in plotting both theoretical and practical turnouts from straight jackets only. The rest of this table is self-explanatory when taken jointly with the sketches below it. It is to be noted that the radii of the theoretical turnouts are not of the center of track, but of the gage of the "curved lead rail."

The distances in "SL," "PrL" and "SS" columns are practical, being based on Pennsylvania Railroad standards. The practical

THE AMERICAN BUREAU OF
INSPECTION AND TESTS
Consulting and Inspecting Engineers
New York CHICAGO PITTSBURGH
Copyright 1907 by E.B. Wilson

leads, "PrL," are measured between actual points along the "straight lead rail" and are based on P. R. R. standard length straight switch points (5¼ in. spread at heel) and frog toe rails connected by regular curves.

Following is an example of the combined use of Tables I. and II. in plotting or laying out a theoretical No. 8 turnout from the inside of a curve of 2,865 ft. radius, scale 40 ft. = 1 in.

The degree of a curve of 2,865 ft. radius is 2 deg. 00 min. (Table I). By subtracting this from 9 deg. 29 min., which is the degree of curve for a No. 8 theoretical turnout from a straight track (Table II.), the degree of curve of the desired turnout, 7 deg. 29 min., is obtained. Therefore, the nearest curve (Table I.) for plotting the turnout is No. 19. Where the turnout is from the inside of the main track the degree of the two curves should be added.

American Railway Association.

The fall session of the American Railway Association was held at New York City, October 30. There were present 75 members, represented by 175 delegates. The present membership of the Association is 331 members, operating 235,457 miles, and 46 associate members, operating 1,457 miles.

The committee on car service reported having held five meetings. Twenty-four roads have joined the Per Diem Rules Agreement and three have withdrawn. Two of the three have been put on a car demurrage basis, and the other one is the New York, New Haven & Hartford. The committee recommends to the favorable attention of the members the interline card way bill which has been prepared by the Accounting Officers' Association.

The committee recommends a new code of demurrage rules, which with a few minor changes, was adopted. This code is the result of a careful study of all demurrage rules now in use, and careful consideration of criticisms of members of the association. While the free time prescribed is 48 hours, and while, therefore, some roads may not be able to adopt the rules without modification, the committee hopes that such modification will be found necessary only for a short time. The committee has restored the use of the word "demurrage" in place of the meaningless term "car service." This change has been made after careful consideration. The committee strongly recommends that demurrage be collected with the same strictness as freight bills.

The committee recommended and the Association adopted changes in car service rules 1 to 4, in line with the recommendation which was made six months ago when a penalty for diversion was proposed. As the Association, in rejecting the penalty rule, did not disapprove the regulations governing the use of foreign cars, these regulations are now again recommended. A slight change is recommended also in car service rule No. 5; also in rules Nos. 9 and 10, to make these rules consistent with the new demurrage rule. Rule 3, which was cut out when the penalty for delay was abolished, is restored, in suitable form to give a road the right to demand the return of its cars. Rule 6 is modified for the same reason. Rule 9 is modified to require the numbering of the sheets of interchange reports. The committee recommends that five copies be made of interchange reports, and that rule 11 be amended to forbid the presentation of corrections in per diem reports until after three months. Premature checking of these reports has caused some difficulty. Rule 15 is amended so that an embargo shall not take effect until after 24 hours. The whole report was accepted after slight modifications.

The Committee on Statistical Inquiry presented an interesting report as to its work, covering the past six months. The report included a report of a sub-committee in regard to tests to determine the mileage allowance to be made engines in switching service. The name of the Committee on Statistical Inquiry was changed to the Committee on Accounting and Statistical Inquiry.

The Committee on Standard Cipher Code reported that 2,995 copies of the Standard Cipher Code are now in use by members of the Association. The committee has authorized the publishers of the "Pocket List of Railway Officials" to designate in that publication all officials who use a Standard Code.

The Committee on Transportation of Explosives included in its report a list of manufacturers of explosives and a list of magazines. It referred to the work accomplished by the Bureau of Explosives, and also submitted for consideration revised regulations for the transportation of explosives and regulations for the transportation of inflammable substances.

The recommendations of the Committee on Standard Rail and Wheel Sections were for the most part approved, and the points of disagreement were referred back to the committee with instructions to investigate further, and with authority to employ experts for this purpose.

The Committee on Standard Location for Third Rail Working Conductors, in its report, embodies a series of definitions, which were adopted.

The Committee on Car Efficiency presented an elaborate report, together with statistics showing car performance. Most of these

statistics have been reported in previous issues of the *Railroad Gazette*. The report says, in part:

The roads which normally hold and use cars in excess of the number they own are still found chiefly in New England, the Southwest and on the Pacific Slope. Most of the roads holding such an excess have ordered a considerable amount of new cars. The committee has been able to suggest, in a number of cases, transfers of equipment which have taken care of surplus cars and reduced shortages. Better results would be obtained if all roads were to send in regular statements showing the location of their cars, as well as copies of their daily interchange reports showing cars delivered to their connections. Demurrage rules covering bituminous coal handled at tide-water were adopted April 1, by six of the seven roads handling such coal at New York, Philadelphia, Baltimore, Norfolk and Newport News; and the seventh line will probably adopt rules on the first of April next. The rules are in effect on anthracite coal on one road, and will probably be put into effect on anthracite coal on other roads shortly. The rules are supervised by a committee, which meets monthly. Its chairman is also chairman of this committee. The roads are handling more coal this year than last, and in less cars. Demurrage rules covering bituminous coal handled on Lake Erie were adopted July 1 by all roads handling such coal. These rules are supervised by a committee, with chairman and secretary, the same as those of the Tide-Water Committee. The committee has attempted to secure the formation of a box car pool, one of the essential rules of which would be the imposition of a very high per diem or penalty charge at times when cars are scarce, but it has not succeeded in securing the promise of enough cars for such a pool to warrant a trial. The attainment of this principle will be impracticable so long as so many roads are without the equipment necessary to do their own business. The increase of the per diem rate to 50 cents has made it profitable to own cars. * * * The committee recommends a strict adherence to the 50-cent rate and a prompt reporting of freight car interchanges, locations, shortages, surpluses and congestions to the Clearing House in Chicago. Daniel Willard was elected First Vice-President. The next meeting will be in New York City on April 22, 1908.

Car Efficiency for April.

The American Railway Association Committee on Car Efficiency, Arthur Hale, Chairman, has issued Bulletin No. 6 showing car balances and performances for the month of April, 1907. The principal results, as compared with preceding periods, are summarized in the bulletin as follows:

During the month of April, 1907, the severe shortage which had existed throughout the previous winter had been relieved to some extent, although it was still severe enough to warrant a continuation of the earnest efforts which were made by the railroads of the country to secure a greater efficiency from their freight cars. The marked improvement in the performance denotes the success which rewarded those efforts.

The "average miles per car per day" shows an increase of 1.3 miles over the first quarter of 1907; the per cent. of loaded mileage about held its own and the "average tons per loaded car" shows a slight increase. The net result of these factors is represented in the "average ton miles per car per day," which shows an increase of 22 ton miles, or 6.7 per cent. The improved performance is also reflected in the earnings, which show an increase of 14 cents per day in the average "per car on line."

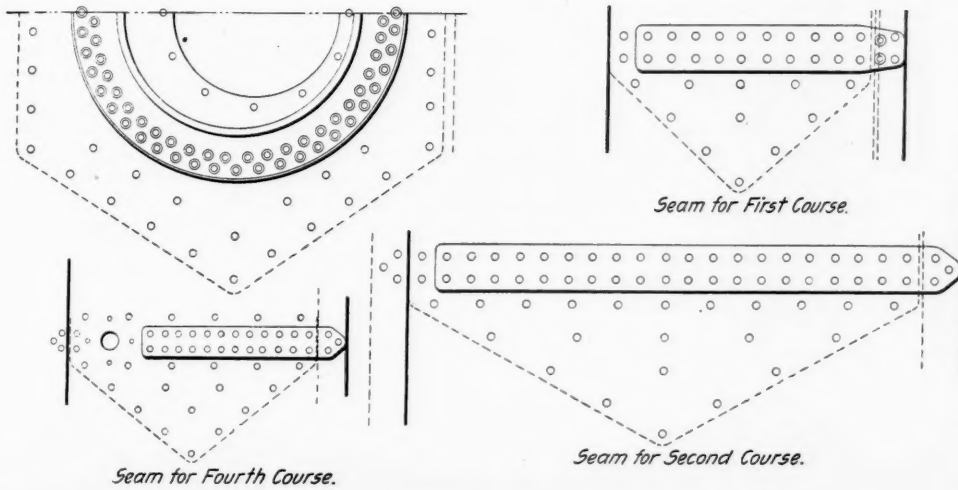
While this improvement in performance is quite gratifying, it is to be regretted that it was not accompanied by a similar improvement in the situation as regards car balance. Although there have been gains on a number of the large owning lines, it will be noted that as a rule those roads which habitually use more cars than they own still show large excesses on line, while several of the large car owners have lost equipment.

The losses which car owners suffer from an unequal balance may be graphically demonstrated by comparing the per cent. of cars on line with the average earnings per car.

Taking for instance Group 3, which during the period of this report shows the largest net loss in equipment, we find that the total shortage on roads having less than 100 per cent. on line is 48,615 cars.

Based on the average daily earnings per car on line, and assuming that these roads could have used their full quota of cars, the loss in gross freight revenue which these lines sustain by reason of this condition aggregates \$110,356 per day. As a credit against this loss, these roads earned per diem on 48,615 cars, which at 40 cents per day (the approximate average for April), amounted to \$19,446, making the net loss in revenue \$90,906 per day, \$2,727,180 per month, or 18.25 per cent. of the gross freight earnings of the roads which are short their equipment. The loss for any particular road may be similarly calculated.

The increase in the per diem rate to 50 cents, effective July 1, 1907, will decrease these net losses somewhat, and a further increase in the rate, or the adoption of a graded per diem would reduce the margin of loss which the lending roads must suffer in



Details of Boiler Riveting.

the Baldwin Locomotive Works. In this seam the outside welt is of simple rectangular form with rounded corners, while the one on the inside tapers off in diamond shape on each side, with riveting spaced at longer pitches than at the center as shown in the engraving of the boiler.

The firebox is radially stayed with the crown and sides in one piece and the outside and roof sheets also in one piece. Two rows of T irons support the front end of the crown, while flexible stays are distributed in the sides, throat and back head. The throat is of ample width at the top and narrows down to 5 in. at the mud ring. The firebox is supported by sliding shoes in front and a buckle plate in the rear. The brick arch is supported on four tubes each 3 in. in diameter. An interesting feature of this firebox is one to which attention has often been called before, the method of distribution of the flexible staybolts. In this distribution it is customary to group them in the vertical rows at the front and back of the side sheets and across the whole length at the top, while common practice does not always put them in the back or tube-sheets. In this case there is the usual grouping in the vertical rows at the front and back, while none is used in the top row for a space covered by 15 stays. On the other hand there is a single row at the side of the back sheet and in the throat sheet the four upper rows are all flexible with the exception of six scattered ones that would interfere with the attachments if they were made flexible. Attention is called to this because of the lack of uniformity of practice on different roads in this matter of the use and distribution of flexible bolts. It would appear that each responsible official is using them where it seems that they are needed, as shown by personal experience, and personal experiences evidently differ widely. It would be interesting to know to what extent the quality of the water used as well as the service demanded has upon the breakage and strain of staybolts.

The smokebox has a short extension, with an adjustable diaphragm plate in front of the nozzle, and double petticoat pipes. The stack is of cast-iron, 32 in. high. It is 15 7/8 in. in diameter at the choke and 17 3/4 in. at the top.

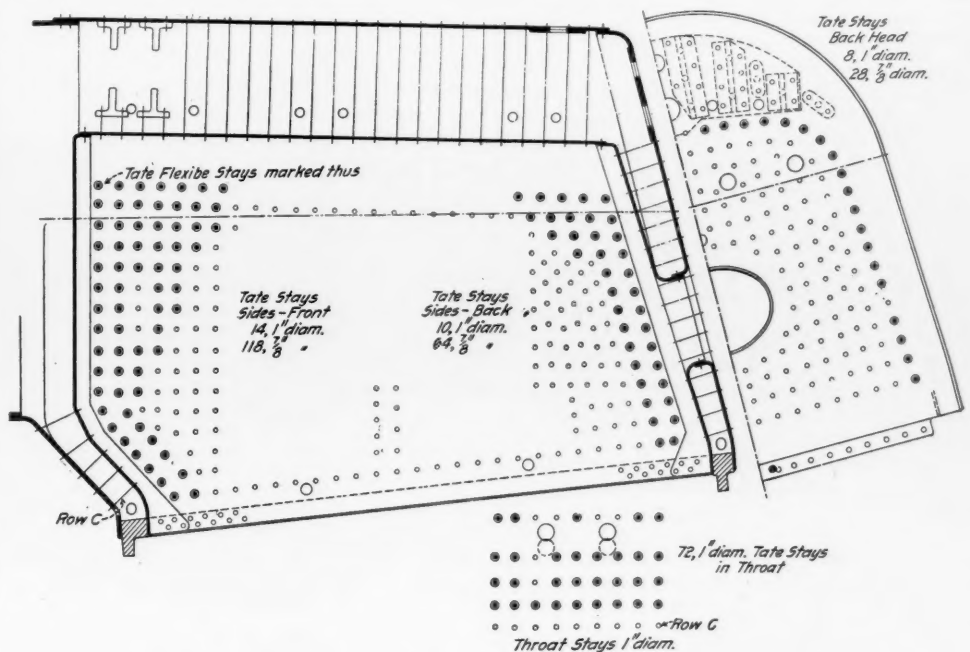
The cylinders are single-expansion, equipped with slide valves and lined with cast-iron bushings 5/8 in. thick. They are double bolted to the smokebox and also in the vertical flanges, and are built with heavy walls and ribs to insure strength against breakage. In accordance with the most recent practice in locomotives equipped with the Walschaerts valve gear, the center lines of the ports are placed 2 in. outside the cylinder center lines, and the use of rock shafts is thus avoided. The valves are set with a constant lead of 5/16 in.; the steam lap is 1 3/16 in., and the exhaust clearance 1/8 in., while the maximum travel is 6 7/8 in. The links and reverse shaft are supported on a substantial cast-steel crosstie, which spans the frames between the first and second pairs of driving wheels. The radius rods are supported directly on the reverse shaft arms by means of sliding bearings, and the links are arranged with cast-steel side plates and double trunnions. Cast-steel is also used for the reverse shaft arms and eccentric cranks.

The main frames are of cast-steel with double front rails of the same material. The rear sections are in the form of slabs,

the new locomotives, as far as power and capacity is concerned, is clearly indicated.

The following is the comparative table of the principal dimensions of these engines:

	Pacific (4-6-2).	10-wheel (4-6-0).
Cylinders, diameter	22 in.	21 in.
Piston stroke	28 "	26 "
Boiler, diameter	70 "	60 "
Boiler, thickness sheets	11/16 & 3/4 in.	9/16 & 11/16 in.
Working steam pressure	200 lbs.	200 lbs.
Firebox, length	108 1/2 in.	120 3/8 in.
" width	71 1/4 "	41 1/2 "
" depth, front	76 1/2 "	73 "
" depth, back	62 "	62 "
" thickness, sides, back, crown	3/8 "	3/8 "
" thickness, tube sheet	1/2 "	1/2 "
" water space, front	5 "	4 "
" water space, sides and back	4 "	3 "
Tubes, number	310	318
" diameter	2 1/4 in.	2 in.
" length	20 ft. 6 in.	15 ft. 1 in.
Heating surface, firebox	186 sq. ft.	168 sq. ft.
" tubes	3,720 "	2,497 "
" arch tubes	29 "



Details of Firebox Staying Showing Location of Flexible Stays.

Heating surface, total	3,935 sq. ft.	2,665 sq. ft.
" grate area	53.5 "	34.7 "
Wheels, diameter, driving	73 in.	73 in.
" front truck	33 "	33 "
" rear truck	51 "
" tender	36 "	36 in.
Journals, main, driving	10 x 12 in.	9 x 12 in.
" trailing driving	9 1/2 x 12 "	8 1/2 x 12 "
" front truck	6 x 12 "	5 1/4 x 10 "
" rear truck	8 x 14 "
" tender	5 1/2 x 10 "	5 x 9 "
Wheel base, driving	13 ft. 1 in.	13 ft. 6 in.
" engine	33 " 5 1/2 "	25 " 1 "
" engine and tender	61 " 2 "	55 " 1 "
Weight on drivers	134,250 lbs.	132,000 lbs.
" front truck	48,550 "	33,950 "
" rear truck	44,200 "
" of engine	227,000 "	165,950 lbs.
" of engine and tender	357,000 "	285,000 "
Tank capacity, water	6,000 gals.	6,000 gals.
Tank capacity, coal	14 tons.	12 tons.
Tractive effort	31,560 lbs.	26,688 lbs.

Weight on drivers	=	4.25	4.94
Tractive effort			
Total weight	=	7.19	6.22
Tractive effort			
Tractive effort x diameter drivers	=	585.5	730.49
Heating surface			
Heating surface	=	73.55	76.80
Grate area			
Firebox heating surface	=	4.72*	6.30
Total heating surface			
Weight on drivers	=	34.11	49.53
Total heating surface			
Total weight	=	57.94	62.27
Total heating surface			
Volume of 2 cylinders	=	12.32	10.40
Total heating surface			
Volume of two cylinders	=	319.4	256.25
Grate area			
Volume of two cylinders	=	4.34	3.34
Tube heating surface equated to firebox heating surface (Vaughan formula), sq. ft.	=	870.57	643.45
Total equated heating surface, sq. ft.		1,085.57	811.45
Total heating surface	=	3.62	3.28
Total equated heating surface			

*Per cent.

Certificates of Public Necessity and Convenience in Massachusetts.

Following is the report of the Massachusetts State Railroad Commission on petitions of the Boston & Providence Interurban, the Boston & New York, the Boston, Lowell & Lawrence and the Boston & Eastern electric railroad companies for certificates of public necessity and convenience allowing the construction of the lines described in their respective proposals. As the chairman of the commission, James F. Jackson is the most accomplished writer in America of lucid reports on subjects of this kind, the present report will be found of interest outside of Massachusetts.

The vigorous rivalry among four groups of promoters, each asking a special charter to authorize the building of an interurban electric railroad between Boston and Providence, and the feeling that the time had come for general legislation with reference to such railways, led to the passage in 1906 of the electric railroad act, under which these petitions are brought. Owing to the close resemblance between the new electric and the old steam railroad, the act provides that a company which desires to build an electric railroad must first secure a certificate that public necessity and convenience require its construction. This had long been the law governing the building of new steam railroads. In effect the statute declares that indiscriminate competition is undesirable, and that the resources of a monopoly, provided the management be efficient and progressive, may provide the largest and best public service; that established companies conducting their business in a proper manner are to be given a reasonable measure of protection, and that the extraordinary right of eminent domain is not to be exercised at the will of those who, professing public purposes, have in view merely private gain.

The question to be decided under each of these petitions is whether, upon the whole, the net results of a proposed undertaking promise public gain or public loss. It surely cannot be said that public necessity and convenience require the building of an additional railroad, if the effect upon existing railroads is so disastrous that the service as a whole is impaired, rather than improved. Men keenly interested in the development of interurban railroads have long had in mind an electric road between Boston and Providence. Though it must openly compete with an excellent steam railroad service, it would offer equal speed with more frequent trains and with freedom from smoke and cinders. Physical conditions are favorable for an electric road of modern type, and as matters now stand it cannot be said that the adventure would be unprofitable. Without exception cities and towns in this section welcome the new service, and no similar accommodation is offered in connection with any existing lines. The question is simply which of the two companies that desire to build shall receive the necessary certificate, for it has been taken for granted from the first that there is room for only one.

The route of the Boston & Providence Interurban is the choice of experts who in the beginning had different lines in view. Their investigation has been exceptionally thorough and their plans have on the whole popular preference in the communities that would be served. This railway would connect existing street railways with a high-speed main line, manifestly a great convenience to patrons. Home capital is largely interested in the road, and the acquaintance of the men behind it with the conditions to be met would warrant the expectation of a high standard of service. The route of the New York & Boston Electric Railroad is of recent suggestion. While this project, as the name indicates, is more ambitious than that of the Boston & Providence, its future would be far more uncertain and speculative, success being dependent upon the ability of the company to prosecute the enterprise in other states where as yet nothing of a definite or tangible nature appears to have been accomplished. In our opinion a certificate ought to be issued to the Boston & Providence Interurban Electric Railroad Company as the company by comparison is in better position to make use of it for the public advantage.

The Boston, Lowell & Lawrence Electric Railroad as planned would pass through Charlestown, Somerville, Medford and Arlington, connecting with the Boston Elevated system in Charlestown. Residents of these cities and towns earnestly remonstrate against the building of this railroad. Though these remonstrants cannot rightfully set up their local interests as an impassable barrier to all new facilities for travel between Boston and more distant cities and towns, they may reasonably ask that their interests shall not be heedlessly overridden. It cannot be gainsaid that the railroad which is proposed would interfere with important street railway extensions of the Boston Elevated system, which have long been awaited as a public blessing in these suburban towns. Are prospective benefits from the new enterprise such as to justify the sacrifice of these other public interests? New freight facilities and low fares were prominent features of the prospectus of the Boston, Lowell & Lawrence Electric Railroad. The suggestion of better freight accommodation was attractive in Lowell and would explain much of the interest in the enterprise at first aroused in that quarter; but all intention of carrying on a freight business has since been disavowed. A five-cent fare from any point in Arlington, Medford and Somerville to all parts of Boston was attractive in those communities and explains certain support secured in each; but it has since become evident that this assurance had no substantial basis. The freedom with which stations have been promised and the manner in which methods of operation have been explained challenge faith in the fulfilment of prophecies regarding train service. In general it may be said that the method pursued in placing this project before the public at different times and in different places in the early days of its promotion was notable for indifference to law and conditions and to the possibility that promises made might call for performance. Then, too, the structure which the company proposes in Sullivan square is undesirable and unsightly and the selection of that connection with the elevated system makes rapid transit improbable and aggravates conditions that already vex and menace the public at this terminal. Nor can the company build the structure which it has planned without special legislation, and such legislation has been expressly denied.

Stripped of all the glamor given it by unsubstantial proclamations there is little in the enterprise to recommend it to the business judgment of investors or to give it standing with the public; too little to warrant the exercise of the right of eminent domain or the interference with other public works that the building of such a railway would involve. The standing and character of members of the temporary board of directors who were enlisted in the undertaking cannot be challenged, and able counsel have endeavored to show substantial merit in what the company proposes to accomplish, but the more careful the study and the closer the scrutiny of the history and character of this transportation scheme the less there is found in it to call for a certificate that public necessity and convenience require it.

It does not follow from what has been said that there is no call for an electric railroad in the territory which lies to the north of Boston, and a carefully studied plan for such a railroad has been presented by the Boston & Eastern Electric Railroad Company. Existing railroad and railway companies have argued that they are now giving all needed facilities in this territory, but the argument falls short of the mark. It is true that the Boston, Revere Beach & Lynn Railroad, within the limitations of a steam railroad hampered by ferry connection, is furnishing an admirable service to and from Lynn, and that much commendation is due the management of the Boston & Maine for a service along the north shore that proves its interest in the comfort and convenience of patrons. But this is not the whole story. With all the railroad and railway lines that now serve it, this densely populated territory, especially its rapidly growing cities, needs additional facilities both for immediate use and for its development of a commercial prosperity that might be realized were larger instrumentalities at hand.

As we have before stated in criticising recent exasperating delays in the running of trains, it is apparent that railroad terminals, yards, tracks, rolling stock and motive power are to-day inadequate for the demands of traffic. With passengers and freight overtaking present accommodation, there can be no doubt about the benefit that might be received from a quick and frequent electric service in this section of the state, a service distinctly different from any now given upon railroad or street railway. If the Boston & Maine were making, or were in a position to make, immediate and extraordinary expenditure for track extension and new equipment to meet the situation, and were ambitious to itself provide electric interurban trains, we would agree that better things for the public could be secured through the enlargement of this service than through the wasteful expedient of inaugurating competitive enterprises. It is idle to argue, however, that in the present state of affairs the service given by steam railroads and street railways is supplying the transportation facilities upon which the commercial prosperity of this section of the state must depend for a wholesome existence and growth.

Of equal importance with the recognition of an opportunity is the selection of the right way to meet it. The plan of the Boston & Eastern Electric Railroad, though carefully studied, is not satisfactory in the way it provides for Lynn, and is fatally defective at the Boston end of the undertaking, in proposing a connection with the Boston elevated railway at Sullivan square. That feature of the enterprise is absolutely prohibitive. The travel which now comes to Sullivan square as a connecting point between elevated and surface lines overloads the railway, and the relief which is promised through changes soon to be completed cannot with our consent be endangered by conducting an additional tide of travel to this point.

The Legislature of 1906 in distinguishing the new electric railroad from other railroads and railways calls for a broad outlook on the part of those who make use of it and for the adoption of a far-sighted policy that will not shrink from large outlays in bringing about the benefits that are possible under it. It would be a lamentable mistake to indorse an enterprise that fails to fully grasp the opportunity presented, and to permit the construction of a railroad which in a few years would probably be only a stumbling block in the way of carrying out larger plans for the public good. In our opinion no electric railroad can successfully reach Boston from the north that does not secure an entrance to the city independent of the existing elevated structure in Charlestown. Without intending to define any exclusive route it may be suggested that the present tunnel or a second tunnel under the harbor might well be the connecting link.

Our conclusion is that while public necessity and convenience call for enterprise in this field, the present route of the Boston & Eastern Electric Railroad does not meet the emergency. Its petition, however, is not dismissed, but held to await further study and development of plans by this or by any other public agency desirous of furnishing additional transportation facilities in this territory.

Commissioner Clark on the Freight Car Situation.*

* * * In the year ended June 30, 1896, the railroads of the United States, with 20,300 freight locomotives and 1,200,000 freight cars, moved 95 billions of tons of freight one mile. In the year ended June 30, 1900, with 21,600 locomotives and 1,365,000 cars, they moved 141 $\frac{1}{10}$ billions of tons. In the year ended June 30, 1906, with 30,000 locomotives and 1,800,000 cars, they moved 216 billions. That is, in 1896 each locomotive moved 4 $\frac{1}{2}$ million ton-miles, and each car moved a little less than 50,000 ton-miles. In 1906 each locomotive moved a little less than eight million and each car 120,000. Thus, the actual efficiency of each locomotive and each car was increased about 50 per cent. It may be said that the numbers of locomotives and of cars did not increase as much as they should, but in that period a very large proportion of the locomotives and cars were replaced with new ones of greater capacity, the construction of which kept builders busy.

The history of the winter of 1906 and 1907 in the Northwest is one of unheard of difficulty for shippers. Severe weather conditions added greatly to the hardships of both shippers and would-be shippers who could not get cars and also to the difficulties under which the carriers labored. And yet it was testified by a well-informed witness, who was a complainant against the carriers before the Interstate Commerce Commission, that the amount of lumber actually moved by the railroads out from the state of Washington, exclusive of movements between points in the state, was 800 per cent. greater than in 1900.

During the same season an up-to-date double-track railroad in the East became so congested with traffic that was poured in upon it from the West that its principal connection held back loaded

cars until many miles of one main track were occupied with cars so held, until tracks and terminals of the delivering road could be relieved. And not long thereafter one of the states served by that road passed a law giving consignees 96 hours' free time within which to unload a car, thus doubling the delay that may be indulged in before demurrage may be assessed.

A large syndicate, owning mines, smelters and a railroad, anticipating a proposed increase in the transportation charges on coke, bought up large quantities of it, had it loaded into cars and started on its way nearly across the continent. The price of copper took a bad slump, and hence the coke was not immediately needed. And so some 8,000 cars of this commodity are now, and for some two or three months have been held back by some influence other than air-brakes, accumulating demurrage against the consignees not at destination, but at various points on the lines of various intermediate carriers, not only unavailable for use of other shippers who are clamoring for cars, but actually obstructing the free movement of other traffic. These are the things that account for the low average mileage which carriers get from cars and which affect seriously the efficiency of the cars. Why should the carriers be expected to provide storage in such manner? And why should they permit one shipper to thus, through them, impose such injustice upon other patrons, to say nothing of the imposition upon the carriers, whose earnings upon the traffic will seemingly be eaten up in per diem rental on the cars?

I will not stop to suggest the multitude of smaller ways in which the same principles of selfishness and favoritism contribute to the sum total of lack of efficiency of cars and other facilities of transportation.

The whole situation has been summed up in the inaccurate phrase, "car shortage." In such blockades as have been referred to on an eastern road, how would a larger number of cars relieve the situation? As has been seen, there is a substantial portion of the year during which these troubles are not present. Manifestly, if the carriers were to provide themselves with enough cars so that everyone could have all he wanted in the busy season, they must also provide corresponding motive power, terminals, tracks and extra employees. This would mean thousands of locomotives and hundreds of thousands of cars standing idle upon storage tracks (which would have to be provided) during a substantial portion of the year. It seems clear that such an increase in facilities could be had only by the expenditure of many millions of dollars, would be inexcusable economic waste and could be provided and maintained only by largely increased transportation charges. It may be that they could be provided by interring all of the carriers in the graveyard of bankruptcy, but even that would not maintain them.

The communities served by a railroad prosper and fail to prosper just as the railroad is or is not prosperous. Prosperity showered upon the community by nature and Providence brings corresponding prosperity to the railroad if it chooses to place and keep itself in a position to reap that advantage. But if a railroad upon which the community is dependent for transportation fails to furnish reasonably adequate service, the blessings of nature and Providence are to a corresponding degree nullified and wasted. It can bring no good to the community to unnecessarily or unwarrantedly impoverish the railroad. It can bring no good to our country to unnecessarily or unwisely or unwarrantedly cripple these arteries of our national life upon which so much depends.

It is because of this reflection in all of our affairs of the effects of the conduct of our common carriers that it is not possible to apply, in dealing with or in regulating them, just the same business principles that apply in transactions between private parties. To hold that in collection of transportation charges the carrier should be held to the rate erroneously quoted by its agent would be to give widest license to the very discriminations which the law condemns, and would place in the hands of the carriers absolute power to make and break individuals and firms and to create and destroy communities and commercial centers almost at will, deterred only by consideration of their own financial welfare and the possibilities of construction of new and rival railroads. And like results would follow the application of the theory that the man who owns a business may do with it as he wills.

Regulation of railroads by state and national governments, each within its proper sphere and lawful limits, is essential. Such regulation must be firm, sane, reasonable and just. Those who administer it must be actuated solely by a desire and a determination to do the right thing by both sides, and must not be influenced by the clamor of the extremists on either side. In that way only can lasting good be done and substantial progress be made.

The American people will not object to paying whatever transportation charges may be necessary to permit the railroads to keep the properties up to date and to earn fair and substantial profit and return upon capital invested therein when they, the people, can feel assured that the capital is in the property and that stocks and bonds are not being added to in multiples of millions with no corresponding investment for the welfare or earning power of the property. The people will never fail to disapprove such tricks of

*Address at Chicago, Oct. 25, by Hon. E. E. Clark, member of the Interstate Commerce Commission. Addresses given by Messrs. Boyd and Hale, at the same time, were reported in the *Railroad Gazette* of Nov. 1, page 524.

high finance as have recently been exposed. The people desire and would be willing to pay for high grade and efficient service. The people must have that kind of service, and, having it, must expect to pay for it that which it is really and fairly worth.

If the railroads cannot secure the co-operation of shippers in the effort to get the highest efficiency from cars in congested seasons, and if the railroads are not strong enough to adopt and enforce adequate rules to that end, it would seem that the only thing left would be for the Federal Government to take the matter in hand as a regulation of commerce and apply such rules and practices regarding use and interchange of cars as will provide the best and most equitable service and results. In that, as in any other feature of regulation of the carriers, care must be taken to do simple and even-handed justice, regardless of what would be popular at a certain time. The carrier that has neglected to provide itself with its proper quota of cars may not expect that its needs will be supplied from the equipment of its more provident neighbor. The shipper who has neglected to provide himself with facilities for doing his business as economically and efficiently as his more enterprising competitor may not expect special consideration of his needs at the expense of others or of the carriers.

The privately owned or exclusively leased car should be eliminated from use in moving ordinary traffic. Satisfaction among shippers may not be expected so long as certain of their number are given exclusive use of facilities which the carrier should furnish to all alike and which, in fact, perhaps, are the property of the carrier. There is and probably always will be room and reason for using special and privately owned cars for certain classes of traffic which require refrigeration, tank cars, poultry cars, etc. But even then their use must be open to all and for all alike.

The railroads have upon them, and must struggle from under a heritage of woe resulting from the mistaken policies, evil practices and unreasoning competition in the past. The shippers are not blameless, and now there is nowhere to turn for relief and correction except to Government regulation.

* * * Only a year has passed since the law became effective which contemplated and which brought about more radical and sweeping changes in practices in the conduct of transportation and in the relations between shippers and carriers than any law has ever effected before. It is not surprising that the magnitude of the work so undertaken is wholly unappreciated by the average citizen. And so now we are met with many proposals for amendment to the law. No doubt some amendments would be beneficial, but it may well be doubted if it is wise to now open the law for amendment and so jeopardize all the constructive work that has been done under it, especially in view of the readiness with which the commission's interpretations and rulings are being accepted.

In some way the impression has gone out that the commission is hopelessly buried in an avalanche of complaints, and some suggestion has been made that its work should be divided. It is true that the commission has many and varied and important duties to perform, and that it has much work to do. But the commission is by no means appalled nor discouraged. Constant progress is being made. It is true that certain cases before the commission have a somewhat prolonged existence, but it is also true that it is the exception and not the rule to find parties to a case ready to proceed with it when the commission is ready to hear it. The commission pushes the cases before it much more than the cases push the commission.

If the spirit announced by a prominent railroad president* is adopted and adhered to by railroads generally, and by shippers, upon whom the obligations to observe the law rests just as clearly as upon the carriers, and the commission exercises in a broad, fair and practical way its administrative functions and powers, the occasion for judicial work will be reduced to a minimum and will be limited largely to two classes of cases—those in which honest error or oversight has worked injustice, and those involving the rivalries of commercial centers. A commission so exercising its administrative functions will acquire that special and expert knowledge which is essential to a proper exercise of the judicial functions in determining the reasonableness of a rate or of a practice.

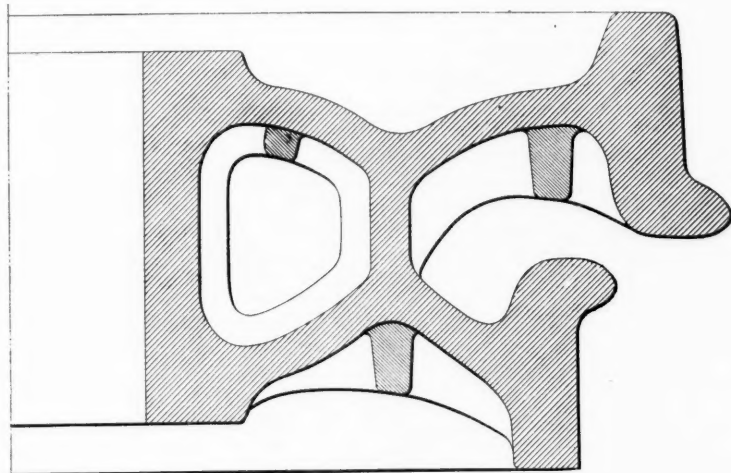
A New Idea in Car Wheels.

A patent was granted Oct. 22, 1907, to P. H. Griffin, President of the New York Car Wheel Co., Buffalo, New York, on a double tread car wheel which is as revolutionary in design as the double plate wheel was when it was first proposed. Summed up, Mr. Griffin's purpose is to divide the destructive effects of heavy wheel loads and the wear and heating action of the brake-shoe between two substantially similar treads and thus to more than double the life of the wheel. The accompanying drawing shows the form of the double tread wheel. The outer tread, of large diameter, rolls on the rail and carries all of the load. The inner tread, of smaller diameter,

is used only for braking, but like the outer tread is cast with a chill ring in the mold. The web of the wheel is made with double plates and curved brackets under the outer flange. The inner tread is supported by a single plate with brackets, springing from the junction of the double plates. This construction requires a longer hub than the ordinary double plate wheel and adds between 200 lbs. and 250 lbs. to the weight of a 700-lb. 33-in. wheel. A wheel of this design is no more difficult to cast than a single tread wheel, the brackets under the inner and outer treads being formed by dry sand pan cores. The claims allowed in the patent specification are very broad. They include all possible arrangements for supporting the inner tread integrally with the web and also provide for cast-iron center, steel-tired wheels.

The principal advantage of this construction is, of course, in relieving the rolling tread from all heating and abrasion of the brake shoe. It is generally admitted that the trouble with ordinary cast-iron wheels under high capacity cars is due largely to the increased severity of the brake-shoe action in combination with the heavier load supported by the wheel. Minute heat cracks are opened in the tread and at the root of the flange and under the action of the load stresses and the flange pressure in rounding curves, these cracks develop into fractures. Such cracks would not be started in a tread not subjected to brake-shoe heating and would not develop so rapidly in a braking rim carrying no load. There is nearly twice as much radiating surface on the double tread wheel to give off the heat generated by the brake-shoe and the temperature of the whole wheel would be lower. This in combination with the longer hub would prevent almost entirely trouble from loose wheels.

The smaller diameter of the braking tread and the narrower gage between the two treads on the same axle might be considered objectionable because they would require brake-shoes and brake-



Griffin Double Tread Cast Iron Car Wheel.

beams of different dimensions than the standards now in use. There are a number of advantages, however, to offset any such objection, in addition to the important advantage of a separate braking tread. The stiffness of a brake-beam varies as the cube of its length and a reduction of 10 in. to 12 in. in the gage of the brake-shoes would result in reducing the deflection of the beam nearly one-half under the same load. The brake-shoes are supported inside of the track rails and if they break off or the brake-beam hanger breaks the shoe will drop down on the ties clear of the rails and will not derail the car. Because of the smaller diameter of the braking tread there will be a slight gain in brake-shoe efficiency because of the lower speed of the two surfaces in contact.

Steam and Trolley in Indiana.

In the July number of *Appleton's Magazine*, Merrill A. Teague prints the following table showing the relative frequency of service and passenger fares of steam and electric lines in the vicinity of Indianapolis:

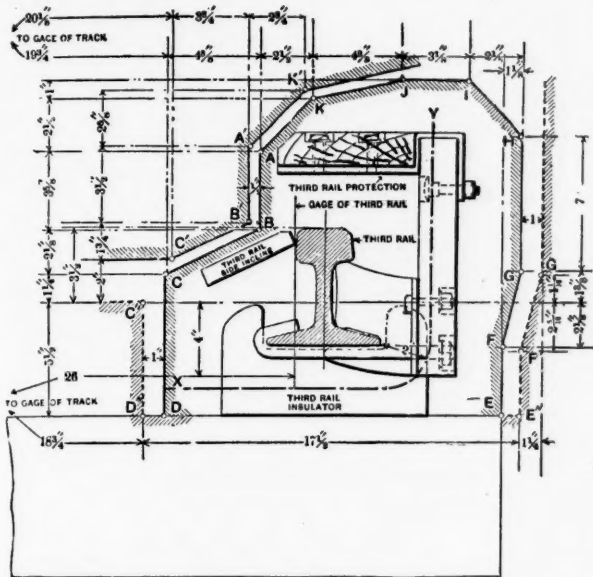
	Miles.	1899		1906	
		Trains Per day	Fare.	Trains.	By trolley Trains. Fare.
To Indianapolis from					
Anderson	39	6	\$1.10	9	20 \$0.60
Muncie	54	5	1.65	7	18 .85
Marion	70	3	2.10	3	16 1.05
Wabash	90	3	2.70	3	14 1.40
Union City	85	4	2.55	6	17 1.55
Crawfordsville	43	4	1.30	4	13 .75
Lebanon	28	5	.85	5	18 .45
Lafayette	64	5	2.00	6	15 1.05
Frankfort	47	4	1.40	3	15 .75
Kokomo	54	2	1.65	3	17 .90
Logansport	77	2	2.30	3	12 1.25
Columbus	41	6	1.25	6	18 .65
Franklin	41	6	1.25	6	18 .65
Richmond	68	6	2.05	7	14 1.05

*Robert Mather, President of the Rock Island Company. His address was published in the *Railroad Gazette*, of Oct. 18.

Standard Location for Third Rail Conductors.*

The committee on Standard Location for Third Rail Working Conductors submitted the following definitions of terms which were adopted by the association:

1. **THIRD RAIL.**—An electrical conductor placed adjacent and parallel to the track rails as a means of conducting electric current to the locomotive or cars. It is maintained in permanent relation to the tracks by suitable supports and is insulated from ground.



Clearances for Top Contact Third Rail; West Jersey & Seashore.

2. **THIRD RAIL CONTACT SHOE.**—A conductor attached to the car or locomotive for the purpose of collecting current from the third rail.

3. **THIRD RAIL CONTACT SURFACE.**—The surface of a third rail with which the contact shoe makes contact.

4. **TOP CONTACT THIRD RAIL.**—A third rail with the contact surface on the top.

5. **UNDER CONTACT THIRD RAIL.**—A third rail with the contact surface on the bottom.

6. **GAGE OF THIRD RAIL.**—The distance measured on the plane of the track between the gage line of the nearest track rail served to the nearest gage line of the third rail.

7. **ELEVATION OF THIRD RAIL.**—The distance at right angles to the plane of the track between the top of track rail and the contact surface of the third rail.

8. **THIRD RAIL SUPPORT.**—The support which holds the third rail in position as regards elevation and gage.

9. **THIRD RAIL INSULATOR.**—That part of the third rail support which isolates, electrically, the third rail from the ground, ties, track work and other grounded structures.

10. **THIRD RAIL PROTECTION.**—A covering employed to guard the third rail against the weather and from accidental contact of persons and material.

11. **THIRD RAIL PLATFORM PROTECTION.**—The guard used at low station platforms to protect the contact shoes from persons on the platform. This term applies principally to the protection along edges of platforms when the third rail is on the opposite side of the track from the platform.

*Abstract of committee report presented at the October meeting of the American Railway Association.

12. **THIRD RAIL END INCLINE.**—The sloping approach at the end of a section of third rail made to receive contact shoes moving in line with the third rail and bring them from their free position to contact with the normal surface of the third rail.

13. **THIRD RAIL SIDE INCLINE.**—The sloping approach at the side of a third rail made to receive contact shoes moving laterally toward the third rail and guide them from their free position to contact with the normal surface of the third rail.

14. **THIRD RAIL TIE.**—The tie which is extended beyond the end of the standard track ties to provide a base for the third rail support.

15. **THIRD RAIL ANCHORAGE.**—A device that holds the third rail in position longitudinally, preventing creeping.

16. **THIRD RAIL JUMPER.**—A cable connecting the ends of the third rail at openings made necessary by track and road crossings or other local conditions. On surface roads the third rail jumpers are usually placed in conduit under ground.

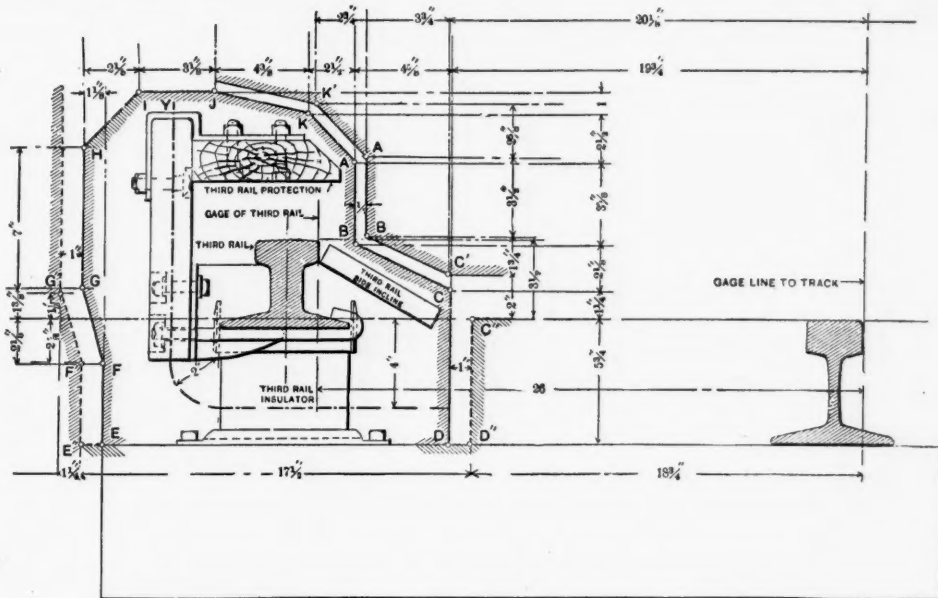
17. **THIRD RAIL JUMPER HEAD.**—A device placed at the end of a conduit for third rail jumper to protect and insulate the end of the jumper. This is usually an insulated structure projecting above the track ballast and from which the third rail jumper may be flexibly attached to the third rail.

18. **THIRD RAIL BOND.**—An electrical conductor bridging a joint in the third rail used to secure electrical continuity of the third rail.

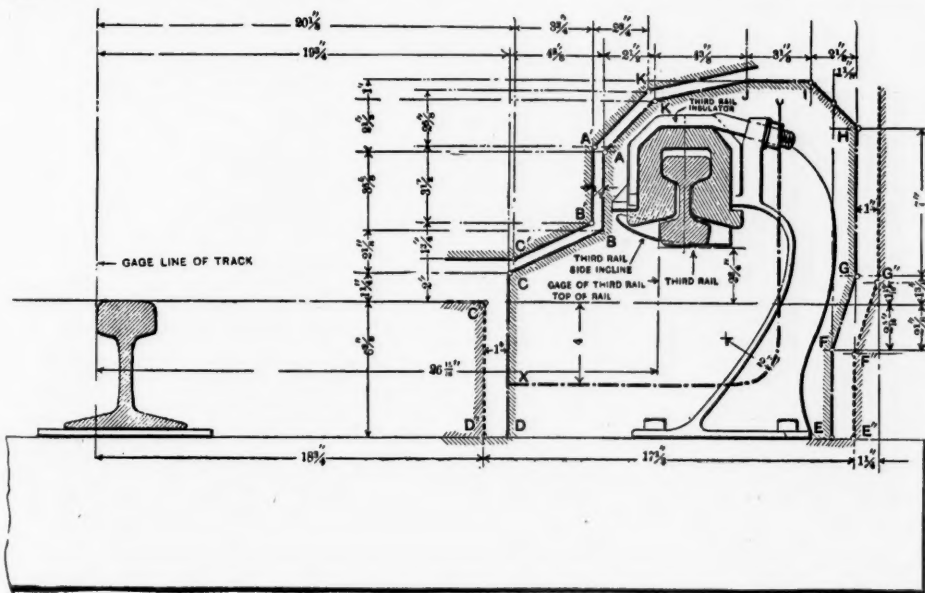
19. **THIRD RAIL FEEDER.**—The connection between the source of power supply and the third rail. This is usually a cable carried either overhead or in conduits underground.

The committee was also instructed to establish a standard location for third rail working conductors on electrically operated railroads for the purpose of facilitating interchange of equipment, electric or otherwise, between different roads. As the third rail must be located adjacent to the track rails, the question of interference with existing permanent way structures and with existing rolling stock is important. In order that the committee may establish a location for the third rail which will interfere least with existing equipment, diagrams were submitted for criticism showing the two types of existing third rail construction in most extensive use, i.e., the "top contact" type, as used by the Pennsylvania Railroad, the Long Island Railroad and others, and the "under contact" type, as used by the New York Central & Hudson River Railroad and others.

The line A-B-C-D-E-F-G-H-I-J-K shown thereon is the limiting line for third rail structure, and is determined by the composite sections of the different types. In preparing this outline, allowance



Clearances for Top Contact Third Rail; Long Island Railroad.



Clearances for Under Contact Third Rail; New York Central,

has been made for the variations which will necessarily occur in the alignment with respect to the gage line of the track and in the elevation with respect to the top of the track rail. These variations occur, due to the wear of the rail head and to the fact that the rail may be deflected from weight of passing equipment, between those ties which support the third rail, without equal deflection of the third rail. Another cause for variations is the wear which takes place in the tie, lowering the track rail without a corresponding lowering of the third rail. It should therefore be understood that the line A-B-C-D-E-F-G-H-I-J-K is the line beyond which the third rail structure shall in no case extend, all variations in the third rail with respect to the base line (top of rail and gage of track) being included.

The line K'-A'-B'-C', the limiting line for rolling stock, has been plotted by allowing 1/2 in. working clearance between this line and the limiting line of third rail structure, and it is considered that rolling equipment should under no conditions of wear or dis-

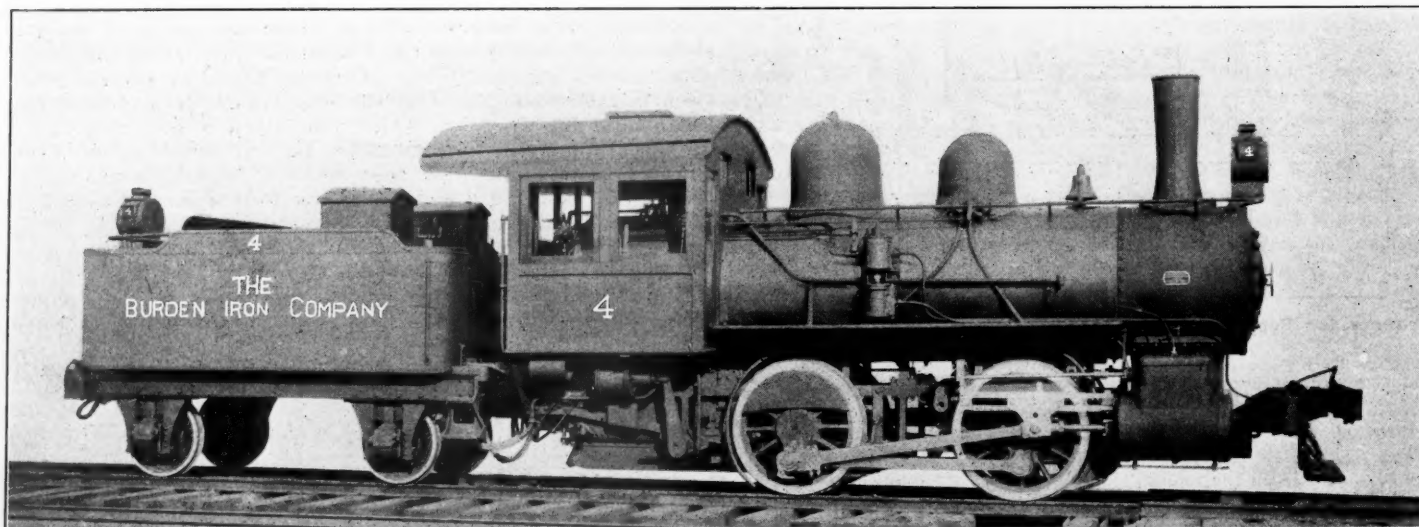
tortion due to broken springs, etc., extend beyond this line.

As the third rail contact shoe is carried on the truck, which has usually a very short wheel base, the distance from the end of the shoe to the gage line of the track is not appreciably affected by curvature of the track, and it is therefore not possible to place the third rail structure at an appreciably greater distance from the gage line of the track on curves than on tangent track. It should therefore be understood that the line K'-A'-B'-C' is the limiting line for rolling equipment on curved as well as tangent track. Allowance in equipment clearance, however, should be made for curved track, depending on the degree of track curvature and the distance between truck centers of the cars, and, to cover yard conditions, the offset of rolling equipment should be figured on curves as sharp as 20 deg. In making this allowance, the side throw of car body as a whole, due to truck bolster end movement, should be added to the total of the horizontal variations, given in the table below, and the effect determined upon clearances of such portions of equipment as steps, truss rods, hoppers, tool boxes, etc. This end movement of bolsters may be taken as $2\frac{3}{8}$ in. for passenger, and $\frac{3}{8}$ in.

Four-Wheel Switching Locomotive.

The accompanying engraving shows the general appearance of a four-wheel switching locomotive that has recently been built for the Burden Iron Co. by the American Locomotive Co. It is intended for service in the yards of the manufacturing company, and is the standard design of the builders for an engine of this type, having cylinders 16-in. diameter with 24-in. stroke. Within the past few years the American Locomotive Co. has been standardizing its designs for small locomotives, and this example is well worked out for the service for which it is intended. The four-wheel switcher has almost disappeared from the railroad yards, where heavy trains are to be handled, and is now confined, for the most part, to the yards of manufacturing firms. The wheel base is well adapted for use over light rails, a poor roadbed and sharp curves, while the adhesive weight and tractive power is sufficient to handle such loads as are likely to be encountered.

The cylinders are 16 in. in diameter by 24 in. stroke, and are actuated by Richardson balanced slide valves. The total weight



Four-Wheel Switching Locomotive; Built by the American Locomotive Co.

for freight equipment. It should also be noted that the third rail may be placed on either the inside or the outside of the curve.

Horizontal Variations in Rolling Equipment Should be Allowed as Follows:

Wear of axle, collars and boxes.....	$\frac{9}{16}$ in.
End play of brasses.....	$\frac{1}{8}$ "
End wear on brasses.....	$\frac{1}{8}$ "
Wear on wheel flange.....	$\frac{3}{8}$ "
Clearance between new flange and rail.....	$\frac{3}{16}$ "
Constructional variations.....	1 "

Total..... $2\frac{1}{8}$ "

Vertical Variations in Rolling Equipment Should be Allowed as Follows:

	Passenger.	Freight.
Wear of journals and brasses.....	$\frac{3}{4}$ in.	$\frac{3}{4}$ in.
Radial wear on wheels. (Passenger, steel tires; freight, cast iron tires).....	$1\frac{1}{4}$ "	$\frac{1}{4}$ "
Compression of springs.....	$4\frac{1}{4}$ "	$1\frac{3}{8}$ "
Sagging at center of car.....	1 "	1 "
Constructional variations.....	1 "	1 "

Total..... $8\frac{1}{4}$ " $4\frac{3}{8}$ "

The line C'-D'-E'-F'-G' represents what is considered the desirable clearance line for continuous permanent way structures. This has been determined by allowing a working clearance of 1 in. between it and the limiting line of third rail structures, and applies particularly to such permanent way structures as station platforms and bridge girders. As the station platforms are usually supported independently of the ties, and the third rail structure is supported by the ties, and as the ties are occasionally shifted with respect to the platforms, the considerable clearance shown is deemed necessary. All variations in the permanent way structures, due to variations in dimensions, warping or deflection of material, should be allowed for, and the results should not encroach beyond the line C'-D'-E'-F'-G', the clearance of 1 in. net being allowed for the possible subsequent shifting of the track as a whole.

The line XY is the allowable clearance line for non-continuous permanent way structures, such as bridge gussets or other structures which are not continuous for length greater than the distance between the third rail ties or between the brackets supporting the third rail protection. In other words, it is a line to which the permanent way may project, provided it comes between the third rail supports and between the third rail protection brackets.

In the year 1906 the number of tickets sold at the stations in Berlin and its 12 suburbs was 136,000,000, 14 per cent. more than in the previous year. Many of these tickets were for two or more journeys, and the total number of journeys was 252,000,000, or about 700,000 per day, and 12 per cent. more than the year before.

in working order, all of which is, of course, on the driving wheels. is 85,000 lbs. With a boiler pressure of 180 lbs. and driving wheels 50 in. in diameter, this engine has a maximum tractive power of 18,800 lbs., which, using the usual figures for resistance on the level and 20 lbs. per ton for 1 per cent. of grade for grade resistance, gives this engine a net hauling capacity exclusive of locomotive and tender on a 1 per cent. grade of 640 tons, and on a 2 per cent. grade of 330 tons. With 18,800 lbs. of tractive power, it will be noticed that the weight on drivers gives a factor of adhesion of 4.52, which is an excellent figure for an engine of this type designed for switching or industrial purposes. With a wheel base of 84 in. this engine will easily negotiate a curve of 65 ft. radius.

In this design, particular attention has been paid to securing the proper ratios between heating surface, grate areas and cylinder volume, as will be seen by a reference to those given below. With 85,000 lbs. on drivers, the engine has a load per wheel of 21,250 lbs., which can easily be carried on a 60-lb. rail. In this design the tender, which is of the "U" shape flat top type, has a capacity of 2,500 gallons of water and three tons of coal. The tender frame is built of steel channels, as will be seen from the drawing.

By changing to a wood-burning stack, the design is well adapted to logging service, as the water and fuel capacity is ample for that class of work.

The following are some of the principal dimensions of the engine:

Cylinder diameter.....	16 in.
Piston stroke.....	24 in.
Valves, travel.....	$5\frac{1}{2}$ "
" lap.....	$\frac{3}{4}$ "
" exhaust lap.....	$\frac{1}{16}$ "
" lead.....	$\frac{1}{16}$ "
Stack, diameter.....	14 in. & $16\frac{1}{8}$ "
Stack, above rail.....	12 ft. 10 "
Boiler, diameter.....	54 "
Steam pressure.....	180 lbs.
Firebox, length.....	$72\frac{1}{16}$ in.
" width.....	$33\frac{1}{4}$ "
" thickness, back sheet.....	$\frac{9}{16}$ "
" crown and sides.....	$\frac{3}{8}$ "
" tube sheet.....	$\frac{1}{2}$ "
" water space, front.....	4 "
" water space, sides and back.....	3 "
Tubes, number.....	178
" diameter.....	2 in.
" length.....	11 ft. 1 "
Heating surface, firebox.....	113.8 sq. ft.
" tubes.....	1,025.2 "
" total.....	1,139.0 "
Grate area.....	16.6 "
Wheels, diameter, driving.....	50 in.
Wheels, diameter, tender.....	33 "

Journals, driver	8 in. x 9 1/2 in.
Journals, tender	5 " x 9 "
Wheel base, engine	29 ft. 7 in.
Wheel base, engine and tender	29 ft. 4 1/2 in.
Weight, engine	85,000 lbs.
Weight, engine and tender	132,700 "
Tender, capacity, water	2,500 gals.
Tender, capacity, fuel	3 tons
Tractive effort	18,800 lbs.

Weight on drivers	
Tractive effort	= 4.51
Tractive effort x diameter of drivers	= 825.29
Heating surface	
Heating surface	= 68.61
Grate area	
Firebox heating surface	= 10.0*
Total heating surface	
Weight on drivers	= 74.63
Total heating surface	
Volume of 2 cylinders = 6.28 cu. ft.	
Total heating surface	= 181.41
Volume 2 cylinders	
Grate area	= 2.64
Volume 2 cylinders	
Tube heating surface, equated to firebox heating surface (Vaughan formula), sq. ft.	3\$8.0
Total equated firebox heating surface, sq. ft.	= 421.8
Total actual heating surface	
Total equated heating surface	= 2.46

*Per cent.

Investigation of Steel and Structural Members by the Watertown Arsenal.

An increased governmental appropriation has been made available for the current fiscal year for the extension of the work carried on in the past at the Watertown Arsenal in the investigation of the properties of materials of construction. It is proposed to conduct this investigation along lines of the greatest practical value to users as well as manufacturers of materials. In the experimental study of steel and steel products it is proposed to begin with the metal in the ingot and thence to follow it out to the finished sections and to built members.

By authority of the Ordnance Department, William R. Webster, consulting engineer, and Edgar Märburg, professor of civil engineering at the University of Pennsylvania, have been engaged to cooperate in the preparation of the program of tests, and in the prosecution of the work. A meeting attended, at their invitation, by about twenty-five consulting engineers and representatives of leading consuming and manufacturing interests was recently held at the Engineers' Club, New York City, for the purpose of meeting Major C. L. H. Ruggles, Commanding Officer, Watertown Arsenal, and J. E. Howard, in charge of the Watertown Testing Laboratory, with a view of determining the most desirable program for the proposed investigation. This meeting was held in two sessions.

One session, presided over by Dr. Charles B. Dudley, Chemist, Pennsylvania Railroad, was devoted to a discussion of metallurgical questions applying to ingot structure, blooms, billets, slabs and forgings, and it was the sense of the meeting that it was desirable to make a study of these questions a special feature of the proposed work.

The second session, at which J. V. W. Reynnders, Vice-President Pennsylvania Steel Co., presided, was devoted to the consideration of a preliminary program for tests of structural members, including columns, riveted tension members, riveted splices, riveted connections in building construction, and the general subject of riveting.

At the opening of the meeting Major C. L. H. Ruggles, Commanding Officer U. S. Watertown Arsenal, explained that the work was not to be regarded in any sense a government investigation of steel, but that it was the desire of the Ordnance Department to utilize the increased appropriation with a view not only to the needs of the government, but also to making the results as valuable as possible to all persons interested in the subject of steel, whether as consulting engineers or as representatives of consuming or manufacturing interests.

J. E. Howard, in charge of the testing laboratory at Watertown Arsenal, presented in abstract his report to the Ordnance Department in which attention was drawn to the desirability of making provision for the extension of the usefulness of the testing laboratory, and indicating in detail numerous lines of research that might be taken up to advantage.

It was the sense of the meeting that the extension of the testing facilities in this country has not kept pace with the advance in engineering construction, and a resolution was adopted by unanimous

vote that the enlargement of the present facilities at the U. S. Watertown Arsenal by the erection of a testing machine of at least 10,000,000 lbs. capacity was desirable. It was also decided to authorize the Chairman, Dr. Charles B. Dudley, to appoint two committees, subject to the approval of the Watertown authorities, one on Ingot Structures, Billets, Blooms, Slabs and Forgings, and the other on Tests of Structural Materials. These committees have since been appointed and much preliminary work has already been accomplished, which will be submitted at an early date to the engineering profession for criticism and suggestions.

The Bureau of Explosives.*

This bureau has been organized in pursuance of action by the American Railway Association at the March, 1907, meeting, and already has a membership of 78 railroad companies, operating 130,026 miles.

Major B. W. Dunn, detailed from the Ordnance Department, U. S. A., began his duties as chief inspector of the bureau on June 11th, Mr. C. P. Beistle having begun work as chemist about a month previous to that date, and Mr. J. L. Taylor, who has had broad railroad experience, was temporarily taken on to assist in getting the work started.

Arrangements were made with the Pennsylvania Railroad Company to furnish a site and erect thereon a building for the laboratory at South Amboy, N. J., and at this date the laboratory is nearly ready for occupancy. The site chosen is easily accessible, there being quite a number of trains each way daily, connecting with New York and Philadelphia, both by the Central Railroad of New Jersey and by the Pennsylvania Railroad, and at the same time the location of the building is far enough away from surrounding property to be entirely safe and to offer ample facilities for experimental tests of dangerous articles.

Local inspectors have been appointed in the manner provided for by the constitution and by-laws, and have begun their work under the supervision of the chief inspector. The total number of local inspectors authorized to date is 12, and the number in actual service at the present time is eight. As soon as practicable four additional inspectors will be placed on duty.

The method adopted is to begin with lines that, having factories located upon them, handle a large volume of shipments of explosives. Under the direction of the general managers, the local inspector makes a general inspection of factories and magazines, and of the principal stations, transfer stations and junction points, where shipments of explosives are handled. All violations of regulations observed are reported by the local inspector to the proper official of the line and to the chief inspector.

Upon completion of this general inspection, the chief inspector compiles, for the information of the general manager, a condensed report of the more important violations reported and the action taken by the local inspector to secure correction.

The local inspector is then transferred to another locality and, pending the inauguration of a second inspection, the enforcement of these regulations is left to the officials of the line with the exception that, in case of emergency, an inspector is always available for temporary duty.

Experience teaches that constant inspection on all lines is more than desirable, and, as the work develops, it will be for the members of the bureau to decide whether they will authorize that material increase in the expense of the bureau that will be necessary to enable it to take entire charge of inspection work.

It is believed that the work of the bureau will be of great value to the association, and especially to its own members. As the result of practical experience, a large amount of valuable information, leading toward greater safety in the transportation of explosives, has already been obtained.

Based partly on this information, and partly on the fact that owing to the large number of interpretations which have necessarily been made of the regulations for the transportation of explosives, adopted by the association, it has been deemed wise to revise those regulations, and present them for your consideration. The development of the explosive business is very rapid, and new questions are constantly coming up. A number of points have already been found in which the old regulations are defective. The amount of work involved in this revision of the regulations is so great that, although your committee, with the chief inspector, have devoted two meetings to the subject, in addition to the time spent individually over the printed matter, the regulations are not yet deemed sufficiently perfect to be submitted to you for adoption. It has, accordingly, been deemed advisable to present them as proposed regulations, and to ask for criticisms of them by the members of the association.

Special attention is invited to Rule 106 relating to the precautions deemed necessary in accepting shipments of explosives from connecting lines that have not made due provision for enforcing

*From a report of the committee on transportation of explosives to the American Railway Association, Oct. 30, 1907.

the regulations. To prescribe and publish regulations is not sufficient to insure their enforcement. As practice is corrected and improved on lines which are members of the Bureau of Explosives, it is to be anticipated that inspection of shipments, offered at junction points, will be more rigid and rejections for failures to comply with the regulations will increase. This may produce considerable local friction, and the only satisfactory remedy will be found in a uniform enforcement of the regulations by an extension of the inspection facilities and other assistance that are offered by the Bureau of Explosives to all members of the association.

The reports of the local inspectors of the bureau show that the regulations are not properly enforced at the present time, and there is reason to assume that it is only on the lines of members of the bureau that improvements are in progress.

Attention has been attracted to the large number of distributing magazines in various parts of the country from which reshipments of dynamite and other dangerous articles may be made. Such reshipments are more liable to involve defective material than are the original shipments of freshly made explosives offered by the factories.

As an example to show the necessity for competent inspection over non-membership lines, attention is invited to those distributing magazines which have been found to contain deteriorated and dangerous explosives and whose location permit them to make shipments of such explosives over several lines, including members and non-members of the bureau. The inspectors of the bureau have reported a number of such cases, and its members have been duly warned and protected. A dangerous shipment, once en route, may result in widespread danger and disaster in spite of careful handling.

A great deal of progress has been made in securing the co-operation of manufacturers in the difficult task of enforcing the regulations. All permanent reforms in their practice must be based very largely on this co-operation.

A revised list of the manufacturers of explosives in the United States, arranged according to location on railroads, and so far as it has been possible to secure the correct data, has been prepared by the chief inspector.

A start has been made toward providing regulations for the transformation of inflammables and other dangerous articles, and a copy of proposed regulations is likewise submitted herewith for your criticism and suggestion. These regulations may require some modifications before they are quite ready for final action. It is hoped that each member of the association will feel sufficiently interested to carefully study both sets of proposed regulations, and to send their criticisms at an early date to the Secretary, Mr. W. F. Allen, 24 Park place, New York City.

Lack of space prevents us from republishing the interesting circular which follows in its entirety, especially since it is readily obtainable by those interested, and is, at present, only recommended practice. We wish to reprint the following portions, however, to illustrate the principles which governed the committee in its work, and the care with which that work was done.

REGULATIONS FOR THE TRANSPORTATION OF EXPLOSIVES.

GENERAL NOTICE.

1. The safe transportation of explosives is largely influenced by the manner in which they are made and packed for shipment, as well as by the careful and intelligent handling of them by railway employees. Information in regard to the kind of explosives is necessary so that railway employees may not ignorantly incur danger or endanger lives or property.

2. Shipments made by the United States Government will be accepted upon the certificate of an army or navy officer or duly authorized non-commissioned or warrant officer, or civilian employee of the Government, that the shipments are made in accordance with United States Government regulations, including limitations of weight, for which the form of certificate entitled "United States Government Certificate of Explosives Offered for Transportation," will be used and kept on file. All the following regulations, provided for other shipments, must be observed for Government shipments except as to packing and weights.

3. Other explosives, except such as are forbidden, will be received for transportation on the on and after190..., provided the following regulations are complied with, and provided their method of manufacture and packing, so far as it affects safe transportation, is open to inspection by a duly authorized representative of this company or of the Bureau for the Safe Transportation of Explosives and other Dangerous Articles.

4. All explosives, in the form of powder or grains, containing no liquid ingredients, must be packed for shipment in "double packages." The inner package must be securely closed and made of such material that it will prevent leakage of the explosive even if any ordinary defect or injury should develop in the outer package.

STANDARD TEST FOR ALL DOUBLE PACKAGES.

5. When fine sand, filling the interior package, is substituted for the powder and the complete double package is dropped in any manner from a height of four feet on a steel rail, neither package must rupture nor must any of the sand escape.

CONNECTING LINES.

6. Shipments of explosives destined to points beyond the lines of this company will only be accepted subject to these and any additional regulations of the roads over which the shipments are to be moved. Shipments

offered by connecting lines will be received subject to the following regulations:

CLASSIFICATION.

7. For transportation purposes, all explosives are divided into the following groups:

- | | |
|--------------------------|----------------|
| 1. Forbidden Explosives. | 5. Fulminates. |
| 2. Common Black Powder. | 6. Ammunition. |
| 3. High Explosives. | 7. Fireworks. |
| 4. Smokeless Powders. | |

SECTION I—INFORMATION AND DEFINITIONS.

GROUP 1—FORBIDDEN EXPLOSIVES.

See Rules 24 to 26.

8. The following are forbidden explosives:

- (a) Liquid nitro-glycerine.
- (b) Dynamite, containing over 60 per cent. of nitro-glycerine (except gelatine dynamite).
- (c) Dynamite containing an unsatisfactory absorbent.
- (d) Nitro-cellulose in bulk, in a dry condition.
- (e) Fulminate of mercury in bulk, in a dry condition, and fulminates of all other metals in any condition.

GROUP 2—COMMON BLACK POWDER.

See Rules 27 to 31.

9. Common black powder embraces all explosives having the constituents of ordinary gunpowder or similar in composition. This group includes rifle, sporting, blasting, cannon and the prismatic powders.

SECTION II—RULES.

GROUP 1—FORBIDDEN EXPLOSIVES.

24. Forbidden explosives must not be accepted for shipment.

25. Should any packages of high explosives, when offered for shipment, show excessive dampness or be mouldy, or show outward signs of any oily stain, or other indication that absorption of the liquid part of the explosive is not perfect, or that the amount of the liquid part is greater than the absorbent can carry, the packages must be refused in every instance and must not be allowed to remain in the property of the company.

26. Station agents should know that a shipment of leaking dynamite is liable to cause a disaster in spite of careful handling; and that storage, especially in warm and damp magazines, tends to cause leakage. They must for this reason examine with more than usual care all shipments not offered by factories, especially shipments that have been stored during the summer months, as shown by dates of manufacture.

GROUP 2—COMMON BLACK POWDER.

27. Packing—Packages containing less than twenty (20) lbs. of rifle, sporting, blasting or cannon powders must be enclosed in a tight wooden box so that the filling holes of the packages will be up. If the small packages comply with paragraphs 4 and 5 a strong crate may replace the box.

28. Twenty (20) lbs. or over of common black or brown powder must be packed as prescribed by paragraphs 4 and 5.

29. Weight—Packages containing over 125 lbs. net will not be received.

30. Marking—Each exterior package must be plainly marked "COMMON BLACK POWDER," or "BLACK POWDER," or "BROWN POWDER." Additional marks, trade names, etc., may appear if desired by shipper.

31. Car—A car containing shipments exceeding 50 lbs. gross weight must be certified and placarded as prescribed by paragraphs 91 and 92.

GROUP 3—HIGH EXPLOSIVES.

32. No high explosives containing over 60 per cent. of nitro-glycerine, or an unsatisfactory quality or quantity of absorbent material, will be received. The 60 per cent. limit does not apply to gelatine dynamite. Explosives like Rack-a-Rock, one constituent of which is liquid, will be accepted if the liquid is not explosive and is not packed in the same boxes with the other constituent.

33. High explosives consisting of a liquid combined or mixed with an absorbent material must have the absorbent material, in sufficient quantity and of satisfactory quality, properly dried at the time of mixing; and the ingredients must be uniformly mixed so that the liquid will remain thoroughly absorbed under the most trying conditions incident to transportation.

34. Explosives containing nitro-glycerine must have uniformly mixed with the absorbent material a satisfactory antacid having, at least, the acid neutralizing powder of an amount of magnesium carbonate equal to 1 per cent. of the nitro-glycerine.

35. Packing—High explosives, containing more than 10 per cent. of nitro-glycerine, must be made into cartridges not exceeding 2 in. in diameter, or 8 in. in length, and must not be packed in bags or sacks. Bags or sacks of high explosives containing not more than 10 per cent. of nitro-glycerine and not over 12½ lbs. each of explosive, will be accepted as cartridges. The covering of all cartridges, consisting of paper or other material, must be so treated that it will not absorb the liquid constituent of the explosive.

36. All boxes in which nitro-glycerine explosives are packed must be lined with a suitable material that is impervious to liquid nitro-glycerine. Cardboard cartons closed at the bottom and coated with paraffine form a satisfactory lining. Dry sawdust or similar material must fill all the space in the box not occupied by the cartridges. These cartridges, except the bags or sacks authorized in paragraph 35, must be so arranged in the boxes that when they are transported all cartridges will lie on their sides and never on their ends.

37. The boxes must be strong and, when made with lock corners, the lumber throughout must be free from loose knots and not be less than ½ in. in thickness. When nailed boxes are used, the ends must not be less than 1 in., nor the sides, top and bottom less than ½ in. in thickness. The limits for thickness refer to the finished box and not to the undressed lumber. A box must not be too large to be handled readily by one person.

38. High explosives not containing an explosive liquid ingredient and not having a sensitiveness to percussion greater than measured by the blow delivered by an 8-lb. weight dropping from a height of seven (7) in. on a compressed pellet of the explosive .03 in. in thickness and .2 in. in diameter, held rigidly between hard steel surfaces, as in the Standard Impact Testing

Apparatus of the Bureau of Explosives, may be securely packed in bulk in double packages that will stand the test prescribed in paragraph 5. These explosives may also be packed in cartridges.

39. Nitro-cellulose—Packages containing not more than 1 lb. of dry nitro-cellulose, wrapped in strong paraffine paper, or other suitable spark-proof material, will be accepted for shipment if securely packed in double packages that will stand the test prescribed in paragraph 5.

40. Weight—Packages containing over fifty (50) lbs. net of cartridges will not be accepted. For explosives defined in paragraph 38, when packed in bulk, the net weight in one package must not exceed 125 lbs. One box must not contain more than ten (10) lbs. of dry nitro-cellulose.

41. Marking—The boxes must be plainly marked on top and on one side or end "HIGH EXPLOSIVE—DANGEROUS." On the top must appear "THIS SIDE UP," and a diagram showing the position of the cartridges in the boxes. Boxes containing nitro-glycerine explosives must also be marked on one side to show plainly (not in cipher) the date of manufacture and the percentages of nitro-glycerine and of wood pulp, or of other non-dell-quescent absorbent.

42. Car—For shipments of high explosives exceeding 50 lbs. in gross weight, the car must be certified and placarded as prescribed by paragraphs 91 and 92.

43. Wet Nitro-Cellulose—Nitro-cellulose, uniformly wet with not less than 25 per cent. of water, wrapped in water-proof material, securely packed in a strong and tight wooden box containing no other explosive and marked "WET NITRO-CELLULOSE—25 PER CENT. WATER," will be received for transportation without other restrictions than a limit of 220 pounds for gross weight. Nitro-cellulose uniformly wet with not less than 30 per cent. of a volatile solvent, such as fusel oil, or alcohol of any kind, must be packed in strong galvanized iron vessels of the milk can type, with a satisfactory means for keeping them hermetically sealed. Packed in this way it will be transported under the restrictions that apply to packages containing dangerous inflammable liquids. It must be marked "WET NITRO-CELLULOSE—INFLAMMABLE LIQUID."

SELECTION AND PREPARATION OF CARS.

86. For the transportation of common black powder, or smokeless powder for small arms, or high explosives, or fulminates in bulk, or blasting caps—all in quantities exceeding fifty (50) lbs. gross weight—or explosive projectiles, or detonating fuses—in any quantity—only certified box cars in good condition (see paragraph 88), or not less than 60,000 lbs. capacity, must be used. Steel underframe box cars or other cars with friction draft gear must be used whenever practicable.

87. Shipments of a combined gross weight not exceeding fifty (50) lbs. may be transported, when properly stayed and protected from injury, in box cars that comply with paragraph 89, and such small shipments will not require a placard on the car. This relaxation of precautions is authorized, however, solely to decrease the number of placarded cars and with a view to more rigid general enforcement of rules for handling cars containing the more dangerous shipments.

88. Certified cars (see paragraph 86) must be as follows:

- (a) Equipped with air-brakes and hand-brakes in condition for service.
- (b) Must have no loose boards or cracks in the roof sides or ends.
- (c) The doors must shut so closely that no sparks can get in at the joints, and, when necessary, they must be stripped. The stripping for Wagner doors should be on the inside and nailed to the door frame where it will form a shoulder against which the closed door is pressed.
- (d) The journal boxes and trucks must be carefully examined and put in such condition as to reduce to a minimum the possibility of hot boxes or other failure necessitating the setting off of the car before reaching destination. The car must be carefully swept out before it is loaded.
- (e) Holes in the floor or lining must be repaired and special care taken to have no projecting nails or bolts or pieces of metal which may work loose and produce holes in packages of explosives during transit.
- (f) When the car is to be fully loaded with explosives, or when explosives are loaded over the draft bolts or king bolts, these bolts must have short pieces of hardwood, 2-in. plank, spiked to the floor over them to prevent possibility of their wearing through the floor and into the packages of explosives.
- (g) The roof of the car must be carefully inspected from the outside for decayed spots, especially under or near the footboard, and such spots must be covered to prevent their holding fire from sparks. A car with a roof generally decayed, even if tight, must not be used.
- (h) Agent or inspector must examine each car, see that it is properly prepared, and sign a "Car Certificate" upon the prescribed form (paragraph 91) before permitting the car to be loaded.

89. Small-arms ammunition or smokeless powder for cannon, or gun ammunition with empty projectiles, or primers, percussion or combination fuses, or fireworks, may be loaded in any box car in good condition, into which sparks cannot enter and whose roof is not in danger of taking fire through unprotected decayed wood. These cars may be transported without being certified and placarded as prescribed by paragraphs 91 and 92.

PLACARDING OF CARS AND CERTIFICATION OF CONTENTS.

90. Uniform practice is important, and the prescribed forms of car certificates, placards and shipper's certificates must be used.

91. Car Certificates—The following certificate, prescribed by paragraph 88 (h), must be signed by the car inspector before loading and by the shipper, or the railway agent, who inspects the loading and staying of packages. It must be made out in triplicate, one copy to be filed at the receiving station, and the other two to be attached to the car, one on each side, and not less than 4½ ft. above the floor level.

CAR CERTIFICATE.

.....Station.....190.....
We hereby certify that we have this day personally examined car No. and that the roof and sides have no loose boards, holes or cracks; that the doors close so tightly, or have been stripped so that sparks cannot get in at the joints; that the king bolt or draft bolts are properly

protected, and that there are no irons or nails projecting from the floor or sides of the car which might injure packages of explosives; also, that the floor has this day been cleanly swept before the car was loaded, and that we have examined all the axle boxes, and that they are properly packed and oiled; and that the explosives in this car have been loaded according to paragraphs 109 to 118 inclusive of the Regulations for the Transportation of Explosives (General Notice No.).

.....
Car Inspector. Inspector of Loading and Staying.

NOTE—For all shipments loaded by the shipper he, or his authorized agent, must sign this certificate as Inspector of Loading. The shipper should decline to use a car not properly prepared. A car inspector who is also the Inspector of Loading will sign twice.

92. Placard—Each car containing any of the explosives specified in paragraph 86, and in the quantities specified (the limit applying to the aggregate gross weight), must be protected by attaching to both sides and ends, not less than 4½ ft. above the car floor, a placard 16 x 18 in., on which will appear in conspicuous red and black type, on strong white paper, the following:

EXPLOSIVES.

HANDLE CAREFULLY—KEEP FIRE AWAY.

.....Station.....190.....

This car must not be moved in a train carrying passengers, and, if for through road movement, must not be handled in the local freight trains.

Through Road Trains—Not more than three (3) cars containing explosives will be handled in a train for through road movement, and they must not be placed closer than five (5) cars from each other.

Unless length of train will not permit, this car must not be closer than fifteen (15) cars from the engine or ten (10) cars from the caboose.

This car must have air-brakes and hand-brakes in service, and be placed between box cars in good condition with air-brakes in service. The cars between which it is placed must not be loaded with oil or other inflammable material, charcoal, lumber, iron, pipe or other articles liable to break through end of car from rough handling. If this car has a steel under-frame it may be placed between steel coal cars.

Shifting and Local Freight Trains—Shifting and local freight trains may handle more than three (3) cars of explosives per train, provided they are coupled in the air service and placed as near the center of train as possible and every precaution taken to insure safety.

Handling in Yards—When handling cars containing explosives in yards or placing them on sidings they must, unless it is practically impossible, be coupled to engine protected by a car between, and the cars not cut off while in motion. When this is not possible in placing cars, the hand-brakes must be examined and known to be in perfect working order. Other cars must not be allowed to strike a car containing explosives. This car must be so placed in yards or on sidings that it will be subject to as little handling as possible and removed from all danger from fire.

Agents at destination and transfer stations must see that these cards are removed from car as soon as the explosives are unloaded.

93. The agent will be held responsible if a car containing any of the explosives (as prescribed in paragraph 86) leaves his station or a siding within his jurisdiction without having the certificates and placard prescribed in paragraphs 91 and 92 securely and properly affixed.

94. Shippers' Certificate—Before any package containing one or more of the following articles: Black or Brown Powder, High Explosives, Wet Nitro-Cellulose, Smokeless Powder for Cannon, Smokeless Powder for Small Arms, Fulminates, Small-Arms Ammunition, Ammunition for Cannon, Explosive Projectiles, Detonating Fuses, Blasting Caps, Primers, Percussion or Combination Fuses, Common or Special Fireworks, can be accepted the shipper must deliver to the receiving freight agent a duly executed certificate on the prescribed form. The shipper must obtain these forms from the station agent, who must keep an adequate supply on hand.

SHIPMENTS FROM CONNECTING LINES.

106. Cars offered by connecting lines, not known to have adopted and made due provision for enforcing these regulations, will be thoroughly inspected and if it be found that either the car or its lading is not in the condition required by these regulations, the car will not be received until the defects are corrected by the line offering it.

HANDLING OF EXPLOSIVES.

107. In handling packages of explosives at stations and in cars, the greatest care must be taken to prevent their falling or getting shocks in any way. They must not be thrown, dropped nor rolled on the platform or car floor, but must be either carried by one or more men or handled on trucks well adapted to this service, and in such a way that the packages cannot fall.

108. The agent must choose careful men to handle explosives, must see that the platform and feet of the men are as free as possible from grit, and must take all possible precautions against fire. No unauthorized person must have access to the explosives at any time while they are on the property of the company. Suitable provision must be made for the safe storage of explosives and every effort possible must be made to reduce the time of this storage. Prompt removal by consignees must be enforced.

LOADING IN CAR.

109. Boxes of high explosives must be loaded in the car, top side up, so that the cartridges will be on their sides and never so that the cartridges will be on end.

110. All other boxed explosives must be loaded with the boxes top side up. Explosives packed in round kegs, except when boxed, must be loaded on their sides in rows across the car if there is more than one tier. Larger casks, barrels or drums may be loaded on their sides or ends as will best suit the conditions.

111. Whatever the kind or form of the packages, after they are loaded they shall be so stayed by whomever loads the car that they cannot change position under the ordinary shocks of transportation. Special care must be

used so that they cannot fall to the floor or have anything fall on them during transit. Shippers must furnish the lumber and labor required for staying all shipments loaded by them, and this lumber should not be less than two (2) inches thick, except in cases where this thickness is manifestly not required.

112. Detonating fuses and blasting caps must not be loaded in a car or stored with high explosives of any kind, including wet gun cotton, nor with smokeless powder for small arms.

113. Fulminates in bulk must not be loaded with any explosive or inflammable material.

114. When necessary, detonating fuses may be assembled in explosive projectiles shipped by the Government.

115. Fireworks must not be loaded in the same car with any other explosive or inflammable substance, except small-arms ammunition, safety fuse and safety squibs.

116. With the exceptions noted in paragraphs 112, 113 and 115, packages of explosives may be loaded in the same car.

117. No inflammable substance, including nitro-cellulose wet with an inflammable liquid, and no shipment of an acid or of other chemicals, must be placed in a car containing explosives of any kind, or stored on railway property near an explosive. When practicable, special and separate days should be assigned for receiving shipments of explosives and of inflammables respectively. Samples for shipment to the Chemical Laboratory, Bureau of Explosives, should be accepted at any time.

118. In a car containing explosives, all packages of other freight must be so loaded and stayed as to prevent all injuring of packages of explosives during transit.

HANDLING CARS CONTAINING EXPLOSIVES.

119. Cars containing explosives must not be hauled in a train carrying passengers.

120. The conductor must under no circumstances take a car containing explosives from a station, including transfer stations or a siding, unless it is properly carded as per paragraphs 86, 91 and 92, and unless the car appears to be in first-class condition. He must also have in his possession the special card way bill for explosives, paragraph 102, showing record of movement of car over his line.

121. The conductor must in all cases notify the enginemen and trainmen that a car containing explosives is on the train and where it is in the train before leaving the initial station.

122. Conductors must frequently inspect such cars to see that the carding is intact. When any of these cards become detached or lost in transit, the conductor will give notice thereof on arrival at the next division terminal yard to the yardmaster or other person in charge, who must attend at once to recarding the cars as required.

123. When such a car is destined to be transferred, unloaded or stored for any purpose at a given junction, station or yard, the conductor must give due notice to such station by wire of the probable time of arrival and the number of cars (not car numbers), in order that proper provision may be made at that point for handling the car or cars.

124. At points where trains stop, trainmen must examine cars carded as containing explosives and adjacent cars to see if they are in good condition and free from hot boxes or other defects liable to cause damage. If cars are set off short of destination for any cause, the conductor must notify the nearest agent, who must see that every precaution is taken to prevent accident. The conductor must also notify the superintendent from the first telegraph office.

125. Whenever a car containing explosives is opened for any purpose, inspection must be made of the packages of explosives to see that they are properly stayed and in good condition, and that no boxes of dynamite are standing on end. Upon the discovery of leaking dynamite or loose powder the defective packages must be removed to a safe place by careful handling. If necessary, place the car carefully on an isolated siding and notify superintendent by wire.

126. In a through train, a car carded as containing explosives must be placed as near center of train as possible, and not closer than fifteen (15) cars from the engine or ten (10) cars from the caboose, unless length of train will not permit; it must have its air-brake and hand-brakes in service and be placed between cars with air-brakes in service. It must be placed between two box cars in good condition not loaded with oil or other inflammable material, lumber, iron, pipe or other articles liable to break through end of car from rough handling. Cars containing explosives must not be placed in a train within five cars of each other, and not more than three such cars must be placed in any one train. For branch lines special regulations will be made by individual lines and only necessary departures from these regulations will be authorized. See paragraph 92.

127. If the car containing explosives is a steel under-frame car in first-class condition it may be placed between two coal cars.

128. Handling in Yards—In handling cars carded as containing explosives in yards or placing them on sidings, they must, unless it is practically impossible, be coupled to the engine protected by a car between, and the car must not be cut off while in motion. It must be known that the hand-brakes are in good condition. Other cars must not be allowed to strike a car carded as containing explosives. They should be so placed in yards or on sidings that they will be subject to as little handling as possible and removed from all danger of fire.

129. Agents at destination and transfer stations must see that the certificates and placards prescribed in paragraphs 91 and 92 are removed from car as soon as the explosives are unloaded.

DISTRIBUTION OF REGULATIONS.

130. Agents must furnish all the shippers of explosives within their territory with copies of these regulations, and the receipts of the shippers must be mailed to the Division Superintendent.

IN CASE OF A WRECK.

131. In case of a wreck involving a car containing explosives, the first and most important precaution is to prevent fire. Although most of the

group, "high explosives," will burn in small amounts quietly, and without causing a disastrous explosion, yet it must be remembered that it is the characteristic of most explosives to burn, and consequently everything possible must be done to keep fire away. Before beginning to clear a wreck in which a car containing explosives is involved, all unbroken packages should, if possible, be removed to a place of safety, and as much of the broken packages as possible gathered up and likewise removed. Furthermore, it should be borne in mind that many "high explosives" are readily fired by a blow, and many explosives, except when they are wet, by the spark produced when two pieces of metal or a piece of metal and a stone come violently together. In clearing a wreck, therefore, care must be taken not to strike fire with tools, and in using the crane or locomotive to tear the wreckage in pieces, the possibility of producing sparks must be considered. With most explosives thorough wetting with water practically removes all danger of explosion by spark or blow; but with the dynamites, wetting does not make them safe from blows. With all explosives, mixing them with wet earth renders them safer from either fire, spark or blow. In case "fulminate" has been scattered by a wreck, the ground involved after the wreck has been cleared should have the top surface removed and after saturating the area with oil, replaced by fresh earth. If this is not done, when the ground and fulminate get dry, small explosions may constantly occur whenever the mixed material is trodden on or struck.

RULES FOR TRANSPORTATION OF INFLAMMABLE MATERIALS.

SECTION I—RULES FOR SHIPPERS.

1. It is the duty of the shipper to deliver his goods properly manufactured, packed, marked and labeled, and to permit any inspection of his works by duly authorized railway officials deemed necessary to check the proper performance of this duty. The bill of lading prepared by the shipper should also give complete information as to the nature of the material in his shipment. For example, the word "Cement" does not properly describe a shipment consisting of "Rubber Cement—Volatile Liquid."

LABELS.

2. All exterior packages containing inflammable materials or acids, including tank cars, must have securely and conspicuously pasted on them when presented for shipment a label of diamond shape. In pasting his label on tank cars the shipper must be careful to remove the old label. The color of the label will be red for packages in Group 1, yellow for packages in Group 2 and white for acids.

3. With these rules as a guide, shippers will have no difficulty in reaching a prompt and accurate decision as to the proper label to apply to a given package; and they will appreciate the importance of the label when informed that rules are based on them for the guidance of railway employees in handling, storing and loading packages protected by them.

4. Any deception, by a shipper or his agent, consisting in a misrepresentation of the nature of his shipment, by the use of the wrong label, or otherwise, and for any improper purpose, will be prosecuted under any law applicable to the offense.

5. Each label must bear the signed, stamped or printed name of the shipper, or of a party or firm for whom the shipper has assumed the responsibility in writing, as an assurance that the shipper has complied with these regulations. Blank labels will be supplied by station agents, or shippers may have them printed for their own use.

CLASSIFICATION OF INFLAMMABLES.

GROUP 1—VOLATILE LIQUIDS.

6. This group includes any cement, drier, lacquer, paint, paste, solvent, varnish or any other compound or mixture that gives off inflammable vapors (as determined by the "open test" known to all chemists) at or below a temperature of 100 deg. F.

Some examples of substances that may place any mixture containing one or more of them in this group are:

Acetone.	Ether.
Alcohol, Amyl.	Fusel Oil.
Alcohol, Grain.	Gasolene.
Alcohol, Wood.	Naphtha.
Benzine.	Petroleum Ether.
Benzole.	Tar, Coal, Undistilled.
Bisulphide of Carbon.	Toluol.
Coal Tar Naphtha.	Turpentine.
Crude Oil.	Xylol.
Cylinders Containing Inflammable Compressed Gases.	

PACKING FOR GROUP 1.

7. All materials must be packed in strong and tight barrels or preferably in metal drums or vessels, and all packages must be securely closed.

8. Packages must not be entirely filled. Sufficient interior space must be vacant to permit expansion of liquid and vapor, and prevent distortion of containers.

9. A red label, of diamond shape, measuring 5¼ in. on each diagonal, and bearing the following inscription in black letters, will be pasted on each exterior package that contains any interior package belonging to this group: [Caution Label omitted.—EDITOR.]

GROUP 2—INFLAMMABLE SOLIDS.

10. This group includes all materials subject to spontaneous combustion; or liable to cause fires when packages containing them are ruptured; or of a highly inflammable nature when ignited. The following list shows prominent examples, but is not intended to be complete:

Barium Peroxide.	Phosphorus, Yellow.
Calcium Carbide.	Potassium Chlorate.
Cotton Waste (olly).	Potassium Permanganate.
Matches, Friction.	Potassium Peroxide.
Metallic Sodium or Potassium.	Celluloid.

PACKING FOR GROUP 2.

11. Packages must be tight and strong, and the interior packages must

be so cushioned and secured that no rupture of either package can result from the ordinary shocks incident to transportation.

12. A yellow label, of diamond shape, measuring 5¼ in. on each diagonal, and bearing the following inscription in black letters, will be pasted on each exterior package containing one or more packages belonging to this group, and no package belonging to other groups: [Caution Label omitted.—EDITOR.]

GROUP 3—ACIDS.

13. This includes the liquid mineral acids, that may cause fires or damage other shipments, and consists principally of the following:

Hydrofluoric Acid.	Sulphuric Acid.
Hydrochloric Acid.	Nitric Acid.

PACKING FOR GROUP 3.

14. Hydrofluoric acid in india rubber or ceresine bottles, hermetically sealed, or in lead carboys, packed in strong cases, barrels or casks, or acid may be packed in tight hardwood barrels lined with asphaltum. Barrels to be painted on outside with acid-proof paint, securely hooped and carefully inspected by shipper.

15. Sulphuric or hydrochloric acids in earthen jars, or glass bottles, or carboys, all hermetically sealed. Jars or bottles must be packed in a strong case and well cushioned; carboys must be packed in special cases provided with strong handles.

16. Nitric acid of gravity below 1.48 must be packed as prescribed for sulphuric or hydrochloric acid, except that the bottles, jars or carboys must be well cushioned by elastic incombustible dunnage. When the gravity is above 1.48, the bottles, jars or carboys must, in addition to the elastic dunnage, be surrounded by an equal volume of incombustible absorbent material.

17. Mixed nitric and sulphuric acids may be packed as prescribed for nitric acid, or shipped in strong iron drums or tank cars.

18. A white label of diamond shape, measuring 5¼ in. on each diagonal and bearing in black letters the following inscription, will be pasted on each exterior package containing an acid of this group: [Caution Label omitted.—EDITOR.]

SECTION II—CAUTIONS AND RULES FOR RAILWAY EMPLOYEES.

PACKAGES OF INFLAMMABLE LIQUIDS PROTECTED BY RED DIAMOND LABELS.

1. Leakage forms gas that may be ignited by a flame of match or lantern.
2. L.C.L. lots of explosives and inflammables should be received on different days. Return to shippers all packages of inflammables not properly labeled.
3. Must never be stored nor loaded in car with explosives, nor with valuable freight: when necessary, may be loaded with packages protected by yellow diamond labels, kerosene oils, etc.; but, as a rule, try to keep these packages separated from all other inflammable articles.
4. Packages must be loaded in car so that all labels of diamond shape, and especially the red ones, are as conspicuous as possible to freight handlers.
5. Load in box cars in good condition, but clear the doors back six inches for ventilation.
6. When practicable store these articles away from other freight in stations and on platforms. Replace lost or detached labels.
7. If necessary to enter at night a placarded car, use electric light only. Station agents will keep portable electric lanterns on hand when other electric lights are not available.
8. Enforce prompt removal by consignee.
9. Upon detection of any strong odor, similar to that of gasoline or of alcohol, seek the broken package and remove it, but do not search at night with lantern. If necessary, place guard on car to keep lanterns away.

The Action of Sea Water on Concrete.

A committee of the Superintendents of Bridges and Buildings Association reporting on the above subject sent a circular letter to members asking information on the following points:

1. Concrete made in air and sunk into sea water.
2. Concrete deposited direct into sea water.
3. What effect has the rise and fall of tide water on concrete?
4. What effect has the frost on concrete where the tide rises and falls on same?

A New York member wrote:

1. Where there is no ice formation, concrete, if made in air with fresh water and then sunk into sea water works well, but shows a tendency to disintegrate slightly on the faces between low and high water levels.

2. I would not deposit concrete direct into sea water. Where the salt water permeates the whole mass of concrete the faces disintegrate faster than where the concrete mixed with fresh water is made in air and then sunk into position in the sea water.

3. Between low and high water the faces of the concrete show a tendency to disintegrate.

4. Where there is severe cold and a large ice formation concrete exposed to the rise and fall of the tide will disintegrate on the exposed faces; (in my experience to a depth of ¼ in. to ¾ in.). If this disintegrated portion is faced up with cement mortar each spring there will be no further trouble until the ice goes out the next winter. Bridge piers and abutments should be built from about 2 or 3 ft. below extreme low water to the top of the masonry, of granite ashlar dressed smooth on the faces exposed to the ice and salt water and backed with concrete.

Another New York member wrote:

1. Mix it dry and put it through chutes into the water; never mix with water before putting into bed.

2. Concrete deposited into sea water will be covered under "1." In the vicinity of New York there is very little of this done; most of the concrete handled at this point is made into blocks and sunk to the depth required and handled by divers. This seems to be the better method and gives more satisfaction than trying to put it in any loose form.

3. The rise and fall of the tide seems to have no effect whatever on the concrete blocks when placed as mentioned above. The frost does not seem to have any appreciable effect on the concrete. Very often granite blocks are placed above the sub-structure of granite blocks, as granite is known to be much stronger than concrete. In places where foundations are on a slope, concrete filled in bags are sunk, which makes a very solid foundation.

A Boston member says:

2. So far as I know this gives perfectly satisfactory results if the material and method of work are right. The cement should contain not over 2 per cent. sulphuric tri-oxide and a low content of magnesia; the sand should be good and crushed stone should be used rather than pebbles; the mixture should be not leaner than 1:2:4, and it should be deposited either with a tube or a bucket on the O'Rourke pattern, which opens wholly inside the bucket, making practically a closed tube for the concrete to drop through. In using a tube the first charge is bound to be washed, hence it is best to begin operations each morning out in the area well away from the forms, so as not to have washed concrete on the outside of the mass when finished. This is difficult to impress on the workmen, as they always want to start operations at one corner. At times there is trouble from the milk of lime, which is too heavy to float away in the water. If it collects more than about 3 in. thick, it should be pumped off or otherwise disposed of; it will not harden, and if covered into the mass will make a weak section. If concrete is properly deposited in pure sea water it sets even stronger than in air, but I prefer to have a stone masonry facing between high and low water. If concrete is exposed to the sun's action between tides it must be extraordinarily good to withstand the combined action of all the forces acting to disintegrate it. An example given as successfully deposited under water, is shown on pages 60 and 61, Proceedings of our association for 1901. There are a large number of piers around Boston built similarly to this, and there has been no failure or trouble with them due to lack of integrity of the concrete. Above low water the pier is faced with stone. Attention is always given to the chemical constitution of the cement used, and it is tested for soundness in sea water by the so-called barrel test. This consists of placing a small barrel in a large cask filled with sea water, and then filling the small barrel with cement through a small tube. After 24 hours the cask is dumped and the barrel cut off from the concrete. If the cement is suitable to use, the concrete will be quite hard and will require a pick to break it up. Analysis for sulphuric acid should accompany this test, as the barrel test alone will not prove durability. A remarkable instance of concrete made in air and sunk into sea water (item 1) has just been executed at Brunswick, Ga., where reinforced concrete piles 18 in. square, 41 ft. long, tongued and grooved, have been placed for a pier facing. These are rodded back to a double row of timber piles and the pier is filled solid with earth. Timber fender piles are driven in front of the concrete face to take the blows from vessels. The concrete piles are sunk by water jet through a pipe cast in the center of the pile.

The report states that all of the replies seem to agree that concrete should be faced with granite above low water, as the rise and fall of the tide has a tendency to disintegrate the concrete. Also that frost and ice formation, where tide rises and falls, has a greater tendency to disintegrate the concrete. A number of structures of concrete in tide-water in the vicinity of Boston were examined and in every structure disintegration was taking place with more or less rapidity between high and low water, in some cases, notably the arches under the piers at Charlestown Navy Yard, this disintegration being to such an extent as to seriously affect the stability of the work. The committee is informed that this disintegration was considerably more rapid in cold weather when frost was experienced than at other times, although disintegration occurs even in warm weather. In some cases the concrete scales off in quite large patches, but in most of these cases it comes out in small particles, so that the stones which form a part of the concrete were left projecting from 1 in. to 2 in. beyond the general surface, or until such time as the weight of the stone would offset what little holding power remained to the concrete at the inner point of the stone. The same trouble occurs with granite above low water. Several places examined showed the mortar had disappeared in the joints and had to be repointed after three or four years.

A concrete pier on the Providence river, at Warren, R. I., was built about 25 years ago with a mixture of sand and cement of about 1 to 3. This concrete is in a good state of preservation, except between high and low water, where it is worn away in places from 4 to 8 in., which looks as if it was done more by the current and ice as the tide ebbs and flows, than by the combined action of frost and tide water rising and falling. The current at this point

runs at about the rate of eight miles per hour, which is pretty fast, and causes quite a whirlpool as it passes the pier. The granite abutments mentioned above, where the pointing was all gone between high and low water, was near this place, above high water the pointing was in good condition.

It is the opinion of the committee that Item 2 is the cheapest and best method of sinking concrete into sea water, and if properly mixed with proper material and properly handled and faced with granite above low water, with a suitable number of headers to make the granite masonry firm, it will do good service. Also that it would add to the stability of the granite if the joints were calked with lead.

The report is signed by G. Aldrich, Chairman; Willard A. Pettis, Geo. W. Andrews and John E. Barrett.

Some Early Royal Railroad Journeys.

BY W. B. PALEY.

The connection of royalty with railroads in Great Britain is of very old standing and certainly does not tend to diminish as time goes on. In fact, it began so soon as the first line of any considerable length was completed. On September 17, 1838, the section of the London & Birmingham Railway between Denbigh Hall, near Bletchley, and Rugby was brought into use and the great work finished after more than four years of unparalleled toil and difficulty. On that day a special train conveying the directors, Robert Stephenson and others, left Euston for Birmingham at 7.15 a.m. Among the passengers was H. R. H. the Duke of Sussex, the Queen's uncle, who took much interest in scientific developments of all kinds. He was attended by a small suite and had with him two private carriages on trucks, but left the train at Rugby to proceed by road to Newstead Abbey, in Nottinghamshire. Contemporary accounts say that the Duke was "introduced into the spacious area and anxiously watched the operation of arranging the order of the carriages." It is further stated that he "appeared throughout the whole of the journey to be highly delighted with railroad traveling," which must have been extremely gratifying to the directors! From the guard's journal, quoted by *The Times*, it appears the engine was taken on at the top of the rope-worked incline at Camden (Chalk Farm) at 7.20 and Tring reached at 8.25. Water was taken here, and the engine changed at Wolverton at 9.16. The new piece of line, for 30½ miles further, was run over so cautiously that Rugby was not reached till 11 o'clock.

It is not recorded that King William IV. ever traveled by rail, but his widow, the Queen-Dowager Adelaide, first did on Oct. 15, 1839, when she went from London to Rugby by the 12 o'clock ordinary train. When returning, however, on Nov. 30 a special train of seven coaches was used, the journey of 83 miles being made in 2 hours 50 minutes. As "some unavoidable delay occurred in passing the 10 o'clock up train at Tring," and the engine was probably changed at Wolverton, this must have been decidedly a fast run for those days. The vehicle used by the Queen-Dowager is still preserved at Wolverton. It is not really a "saloon," however, in the modern sense, but merely a three-compartment first class of the type then used on the mail and express trains, with two ordinary compartments and another "coupé," that is, with only one seat and having windows in the front. It was run over many lines on Queen Adelaide's numerous visits to the nobility in the early forties.

The late Prince-Consort seems to have made his first railroad journey in England on Nov. 14, 1839, at the conclusion of his second visit. Accompanied by his elder brother, he traveled from Slough to Paddington by the Great Western, continuing his way by road to Dover. No particulars of the trip are given in the papers, but after his marriage to Queen Victoria the following year the Prince frequently used the railroad, and, in fact, seems to have preferred it to the uninteresting journey by road. On Sept. 21, 1840, he had a fast run up. A special had been kept in readiness, the Princess Augusta, aunt of the Queen, being on her death-bed in London. The train left Slough at 3.06 p.m. and reached Paddington 3.28½, the 18 miles being run in 22½ minutes, or at the rate of 48 miles per hour. It consisted of an open-sided carriage containing "two old and experienced guards for the purpose of using the break in case of need," and the new saloon just built for the Queen's use. The engine was the "Sun," a 6-ft. "single" of Hawthorn's design, just built by them at Newcastle-on-Tyne. Including the drives at each end, the Prince reached Buckingham Palace in 59 minutes from leaving Windsor.

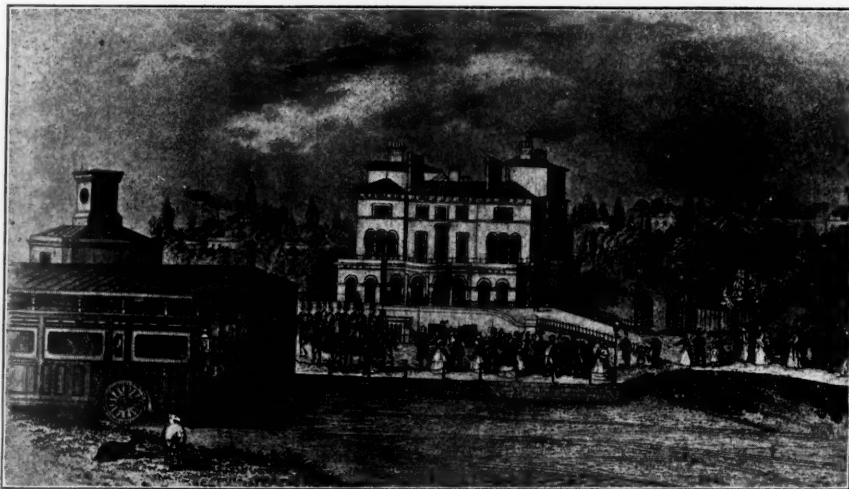
One of the most famous broad-gage runs made by Prince Albert in those days was on July 19, 1843, when returning from witnessing the launch of the "Great Britain" steamship at Bristol. According to the diary of Sir Daniel Gooch, the trip of 118 miles

was done in 124 minutes. This may have been the actual running time, though if it was there must have been much delay somewhere, but the diary is not very trustworthy, and *The Times'* statement that the Prince left Bristol at 4 p.m. and reached Buckingham Palace at 7.15 is far more likely to be correct.

The Great Western had been open between London & Slough for about four years before Queen Victoria ventured upon it, or indeed upon any railroad. In this, possibly, she was guided by the advice of others, and for some time, too, there was no proper station at Slough. However, on June 13, 1842, the Queen made her first railroad journey. Accompanied by Prince Albert she left Slough by special train at 12 noon and reached Paddington at 12.25, Mr. Daniel Gooch, as Locomotive Superintendent, driving the engine "Phlegethon." Brunel also was on the foot-plate, in fact, for many years one or both of them was on the engine of the Royal special on the G. W. R.

Having satisfied herself by personal experience of its comfort and safety the Queen soon entrusted her family to the care of the rail. On Saturday, July 23, 1842, she left Paddington about 3.40 p.m. with Prince Albert, the Princess Royal and the Prince of Wales. The train consisted of four vehicles, namely, the usual open-sided second class, followed by two firsts with the Royal saloon between them, and 'the Mentor' engine having been attached to the train the signal was given and the royal party were quickly out of sight." It is further stated that "Her Majesty and Prince Albert appeared much pleased with the animated scene they beheld." This was the first railroad journey made by the present King, who was at the time only eight months old. Both "Phlegethon" and "Mentor" were 7 ft. "single driver" engines of Gooch's design, similar to the one illustrated in the *Railroad Gazette* of January 8, 1904.

More than a year elapsed after this before Queen Victoria traveled on the narrow-gage, as it was then termed. The occasion was



Royal Saloon at Slough Station, 1842.

a journey to Southampton, on August 28, 1843. Farnborough was the point at which the railroad was taken, after a drive of 15 miles from Windsor. Prince Albert went with the Queen, the trip of 45½ miles being run in 81 minutes without a stop. The train, consisting of five vehicles, was worked by a new engine named "Elk," and left Farnborough at 9.19 a.m.

The Prince of Wales, now King Edward, made his first journey on what is now the standard gage on Sept. 10, 1844. Traveling up to Paddington by the Great Western, the party, consisting only of the royal children under the care of the Dowager Lady Lyttelton, drove by Bramhall Bridge to New Cross station, where they took train for Brighton. The special arrived at 5.45 p.m., the engine being driven by Mr. Benjamin Cubitt, the head of the Locomotive Department. The object in going to New Cross was to avoid the dangerously narrow and crowded streets that then existed near London Bridge station.

It is remarkable, however, that the first railroad journey made in this country by a crowned head was run, not by our own sovereign, but by a foreigner. This was on January 24, 1842, when the King of Prussia, Frederick William IV., who had come over to attend the christening of the Prince of Wales, went up to London by the Great Western for a day's sight-seeing. We are indebted to the *Great Western Railway Magazine* for the illustration.

The average annual mileage of freight cars on the Prussian railroads is stated as follows:

	Miles.		Miles.		Miles.
1851-1860.....	9,247	1881-1890.....	9,832	1901-1905.....	10,384
1861-1870.....	9,750	1891-1900.....	10,251	1905.....	11,127
1871-1880.....	9,186				

Allowing 300 working days in a year, this gives for the year 1905 37 miles for the average daily travel per car loaded or empty.

GENERAL NEWS SECTION

NOTES.

The Pennsylvania now has about 1,000 acres of forest under cultivation, containing 2,250,000 young trees in addition to the seed planted.

The Fall River Line, between New York and Boston, has made its usual autumn reduction in the through fare, which is now \$2.65, instead of \$3.65.

The Baltimore & Ohio is now using fusees with two colors. They burn red five minutes and then five minutes green. Heretofore the company has used fusees burning red ten minutes.

The New York State Public Service Commission, second district, has summoned the railroads of the state to show cause, November 25, why an order should not be issued requiring the sale everywhere of interchangeable 1,000-mile and 500-mile tickets at 2 cents a mile.

The railroads of Chicago have decided to no longer furnish men to assist consignees in unloading those classes of carload freight which, by the terms of the traffic, are required to be unloaded by the consignee himself. It is estimated that in the city 300 railroad employees have constantly been employed in this kind of work.

The New York, New Haven & Hartford has proposed to its western connections that it will pay 50 cents a day for foreign cars, provided the connections will accept enough New Haven cars to make the interchange equal, and also that the New Haven be allowed \$1 a car reclaim, this reclaim to be in the nature of an allowance for the two days' additional free time which it is necessary to give consignees in Connecticut under the law of that state.

In the Federal Court at Little Rock October 25 the suit for an injunction to prevent the Railroad Commission of Arkansas from enforcing the flat cotton rate was dismissed. By a compromise, offered by Commissioner Allen, the railroads may charge a minimum of 50 cents on cotton hauled from one to 15 miles, instead of 25 cents, as originally set by the commission. The compromise carries with it the agreement of the various railroads to continue the concentration rate and to allow the shipper to choose what rate he prefers at any time. Thus is settled a serious controversy.

The Texas State Railroad Commission reports the mileage traveled on free passes over Texas railroads in the year ending June 30, 1907, as follows: Exchange, 21,062,065, or 17.02 per cent. of total free travel. By employees and members of their families, 81,307,345, or 65.69 per cent. of free travel. On account of newspaper advertising, 5,866,836, or 4.73 per cent. of free travel. By public officials of United States, state, county and municipal governments, 7,968,421, or 6.44 per cent. of free travel. By other persons, charity, religious, etc., 7,569,895, or 6.12 per cent. of free travel. Grand total, 123,774,562 miles traveled free, or 11.66 per cent. of the entire travel in the state.

Press despatches from St. Paul say that the shortage of freight cars in the Northwest has now become acute. Although the railroads have bought large numbers of new engines and freight cars during the past year, and although 500 new grain warehouses have been built in Minnesota and North and South Dakota, the increase in population has more than kept pace with these improvements, so that hundreds of shipments of merchandise are now from four to six weeks behind time. Much freight for the East is being transferred so as to insure the retention of home cars at home. At Buffalo, N. Y., all the eastbound roads are reported short of cars. Traffic in the city has become so heavy that a blockade is on, though as yet it is small, as compared with last year. At Chicago the railroads are strained to their utmost to handle freight without delay. Not only is there a larger grain movement than usual at this season, but there is a heavy traffic in live stock, coal and merchandise.

At Seattle, Wash., October 31, the Pacific Coast Lumber Manufacturers' Association secured from the Federal court a temporary injunction against the increase of 25 per cent. in through eastbound rates on lumber, which had been announced by all the railroads and which was to go into effect November 1. In consequence of the court's order the Northern Pacific has announced that no more lumber shipments will be received for the East until further notice. This move is expected to be followed by all the railroads affected by the injunction. The decision requires shippers to give bonds to pay the increased rate, if it shall hereafter be decided to be just, but the roads claim that they would be taking too great a risk to allow the excess freight charges to accumulate until a final decision is made. Litigation will ensue and many of the lumber firms may have gone out of business before the legality of the rate is settled. Another contingency the railroads have to face is the law providing that all rates must be published and posted thirty days in advance. In case they decide to go back to the old rate they cannot do it now without such notice.

Merchants' Despatch Absorbed by N. Y. C.

The New York Central & Hudson River Railroad announces that it has bought the Merchants' Despatch Transportation Company, and henceforth that name, like the names of other fast freight lines, will be only a form for use in advertising. The Merchants' Despatch was organized in 1856, and is believed to be the oldest organization of its kind in the country. Primarily, it was a soliciting agency, employing agents of its own, and paying commissions to the local freight agents of the railroads, to secure competitive west-bound freight. Later it built large numbers of cars, and the management of these cars became a chief part of its business. Many of these cars were refrigerators, for use in carrying eastbound freight, and the profits from car rentals constituted the main part of the company's income. Claims for loss, damage and overcharge on freight will hereafter be settled by the individual roads. No change has been announced in the soliciting agencies.

New York-Boston Steamers.

The Metropolitan Steamship Company has discontinued for the winter its through 15-hour all-water passenger line between New York and Boston. This line, which was operated by the turbine steamers "Harvard" and "Yale," had been running only six weeks. The gossips are undecided whether this sudden cessation of business is due to an agreement with the New Haven road or to a lack of profitable patronage.

The Joy Line has been bought by the United States Transportation Company, operating the Neptune Line. The United States company was formed early this year under Connecticut laws, with \$750,000 capital, and its two boats plying between New York and Fall River were purchased from the New England Transportation Company. The new company is looked upon as a New Haven railroad concern.

"Mauretania" 27.36 Knots.

The new Cunard turbine steamship "Mauretania," on a trial November 5 off the Irish coast, made an average of 27.36 knots (31.5 miles) an hour over a 300-mile course. This is nearly one knot faster than the "Lusitania" made for the same distance on her trial. The "Mauretania" is due to arrive in New York for the first time November 21.

A Hundred-Ton Wagon.

J. A. Shephard & Son, of Brooklyn, N. Y., have built what is believed to be the most powerful wagon-road truck ever constructed. It was built especially to carry the heavy iron girders and columns for the new Pennsylvania Railroad terminal in Manhattan and has a capacity of 100 tons. It is owned by the Meade Transfer Company. The wheels are 3 ft. in diameter, with tires 14 in. wide, and are made of cast-steel. They weigh 3,000 lbs. each. The front axle is 14 in. in diameter in the center and 7 in. at the ends. The rear axle is smaller. These axles weigh about one ton each. The reach is 37 ft.

Panama Canal Record in October.

The Washington office of the Panama Canal reports that in the month of October 1,844,471 cu. yds. were dug from the prism of the canal, an increase of more than 23 per cent. over the quantity excavated in September. The rainfall in October was 17.1 in. In the same month 24,258 cu. yds. were excavated on accessory works.

Protection of Track Circuits from Foreign Currents.

Henry Bezer, whose invention for insuring the safety of automatic block signal operation by neutralizing the effect of stray electric currents in the rails has been in use on the Central of New Jersey for 15 months, has made a radical improvement in his designs, and the improved apparatus is to be put in use on a section of the Cincinnati, New Orleans & Texas Pacific, as well as on another section of the Central of New Jersey. In this latest arrangement the track circuit of a given block section has a battery at the outgoing end, as usual, and at both this end and at the entrance of the section there is an arrangement of special relays by means of which a vibrating current is temporarily produced each time the signal is to be cleared. The signal cannot clear unless an instrument at the track battery end of the block, vibrating at the rate of about two vibrations per second for from 3 to 6 sections, operates the circuit; and when a train is in the block the instrument does not vibrate. There is therefore next to no wear and tear upon contacts. The system is so arranged that the signal is held clear by a direct cur-

rent which follows in and takes the place of this temporary intermittent current. A foreign current, whether direct or alternating, could not produce the vibrations necessary to operate the relays.

The relays will operate with the track battery generally in use, but for the sake of smart vibration Mr. Bezer plans to use 2 volts.

From the exhaustive tests which have been conducted on the Central of New Jersey, it is practically certain that with the new arrangement 2 volts of track battery will be sufficient to combat foreign currents usually met with on steam roads, with the track and the insulated joints kept in reasonably proper condition. That is to say, 2 volts will be sufficient to prevent foreign current holding a signal in the stop position. But whatever the strength of the track battery, neither neglect in track maintenance, nor a broken rail, will enable foreign current to clear a signal. Means are provided also to prevent foreign current from causing the track relay to hold its armature when a train enters the block either from a siding or from the track-battery end.

The installation already in service on the Central of New Jersey is "wireless" and the signals stand normally at clear. A brief description of this was given in the *Railroad Gazette* of January 18, last. With this installation, which is still in service, it is necessary that the maximum foreign current be ascertained and that the apparatus be adjusted accordingly; and in order to give adequate protection in case of a broken rail or adverse traffic conditions, a powerful track battery has to be used. With the intermittent current arrangement now to be used, a foreign current is inoperative, whatever its power, and without regard to whether it is direct or alternating.

By the use of this apparatus and arrangement, the employment of an alternating current is made unnecessary, and it is thus possible to avoid the cost and inconvenience of a power house and long stretches of copper conducting wire, with the increased chances of failure which are inseparable from the added complication.

Steam Consumption in a Curtis Turbo-Generator.

In a paper read before the American Street & Interurban Railway Engineering Association, A. H. Kruesi gave the results of tests at Chicago with a Curtis turbine coupled to a 9,000 k.w. generator. The steam consumption of the turbine per horse-power hour, at the ratings given, was as follows:

Rate	Steam consumption, per h.p. hr.	Rate	Steam consumption, per h.p. hr.
7,200 h.p.	9.81 lbs.	16,125 h.p.	9.74 lbs.
10,814 "	9.70 "	18,625 "	10.15 "
13,650 "	9.62 "		

In which it appears that the steam consumption increased as the power varied in either direction from the normal rating of 13,000 h.p.

Engineering Societies' Libraries.

The reference libraries of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, and the American Institute of Mining Engineers, at the Engineering Societies' building, 29 West Thirty-ninth street, New York City, will hereafter be open evenings until 9 o'clock on all week days except public holidays. These libraries are available to members of the above societies, to engineers and to the public generally, subject to proper regulations. Strangers are requested to bring letters of introduction from members or to secure cards from the secretaries of the respective societies.

Adams Express Company.

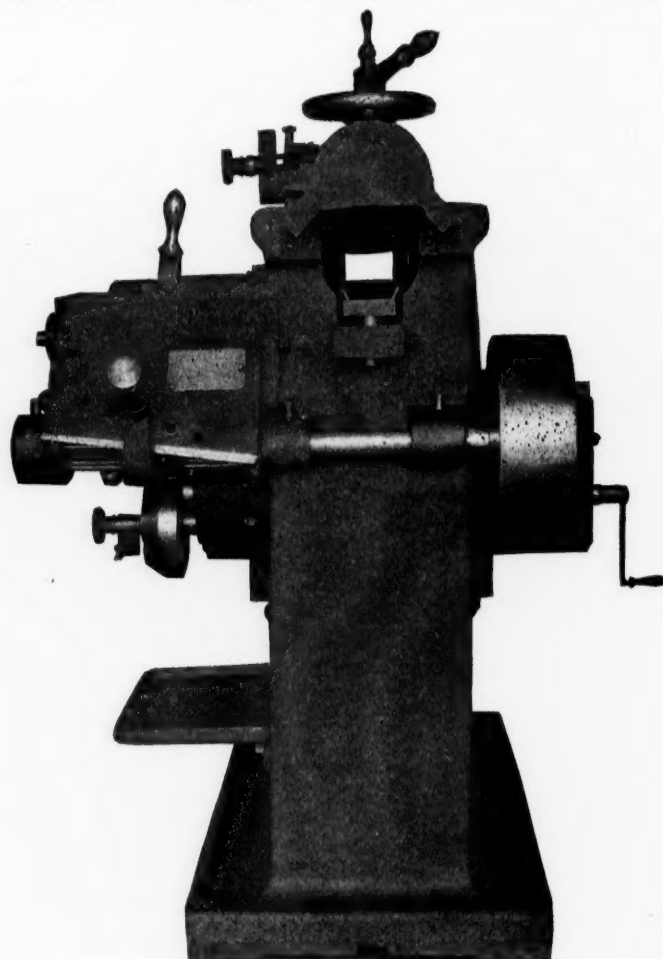
W. W. Barrett, Resident Manager of the Adams Express Company at Philadelphia, Pa., has been elected Vice-President in charge of the territory east of Pittsburgh, Pa., with office at New York City. H. E. Hoff, Superintendent at Baltimore, Md., succeeds Mr. Barrett. G. B. Curtis, Superintendent at Columbus, Ohio, has been appointed General Manager in charge of the territory west of Pittsburgh, with office at Chicago. This is a new office, the work having heretofore been in charge of Vice-President W. H. Daniels.

Reason and Red Tape Coincide.

Army or navy officers desiring to make use of the fastest trains between New York and Chicago must themselves pay the additional rate charged for riding on such trains. A paymaster's clerk received orders to take station at Bremerton, Wash., and he traveled on one of the "flyers" and paid \$7 over the usual rate. His orders made no mention of any need for unusual haste, and in the adjustment of his accounts the extra rate was deducted. The regular overland trains are fast enough to transport officers from one point to another unless they receive specific orders to the contrary. The clerk asserted that he did not know when he purchased his ticket that he was getting other than a first-class ticket, but his duties, it is held, should make him more particular [intelligent?] in his business transactions.—*New York Tribune*.

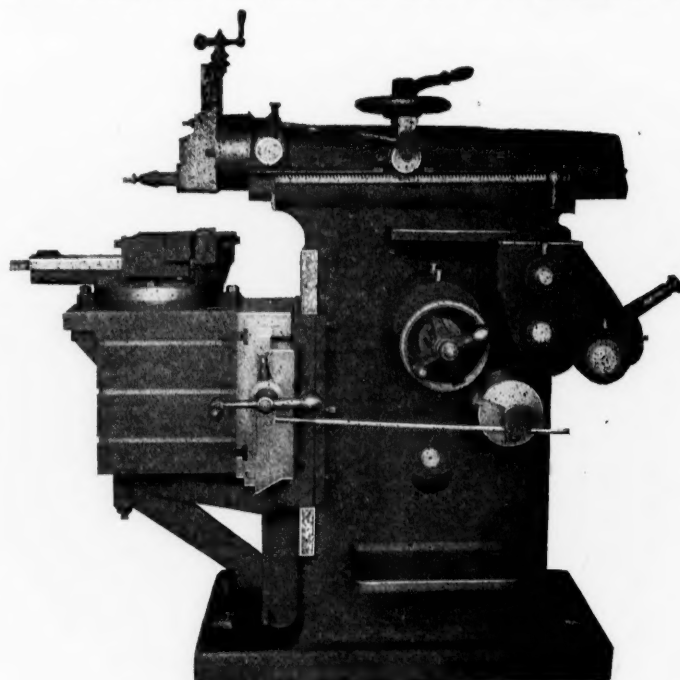
A New Flather Shaper.

The accompanying engravings show a new 16-in. shaper built by the Mark Flather Planer Co., which embodies several improvements. The ram bearings are of an entirely different type from those furnished on shapers heretofore, in that the alignment is



Rear View of Flather Shaper, Showing Gear Box.

maintained by means of the V-way, and that gibs have been entirely eliminated, while at the same time provision has been made for taking up wear. The ways are oiled by a V spring oiler, such as is ordinarily used on planers, and wipers are furnished for both



Side View of Flather Shaper.

ends of the ram bearings. The gear box is designed for heavy duty. All gears are made of steel cut from bar stock and each gear is cut with a cutter made to the exact number of teeth. Ten changes of speed are secured.

The machine is driven by a 4-in. belt and is ordinarily fur-

nished with a tight and loose pulley, to be belted directly from the main line. This avoids the necessity of mounting a counter-shaft on the ceiling, and at any future time the shaper can be equipped with a motor drive by simply attaching the motor to the rear of the column and connecting the driving shaft with suitable gears.

This shaper is furnished with power down feed of a new design. It may be made to feed either down or up, and its construction makes it impossible for the feed attachment to get out of order or wear out. The support for the box table, which is furnished with each machine, is always in position and needs no adjustment.

The Sherwin-Williams Convention.

The Sherwin-Williams Paint Co. held in Chicago last week its twenty-seventh annual convention of officers and representatives, more than 250 of which were in attendance from all parts of the world. The meetings were held at the company's plant at Pullman, there being two sessions a day from Monday to Friday inclusive. At each session there was an address on some matter of special importance to the sales representatives. These conventions serve the dual purpose of a school of instruction and of bringing these men into closer relationship with each other and with their officers. Prizes are awarded to the men having the best records. The program for the week was as follows:

Monday Morning, Oct. 28.—Reception from 8.45 to 9.15 a.m. Address of welcome by W. H. Cottingham, Vice-President and General Manager. Address by S. P. Fenn, Secretary and Treasurer. Distribution of "top-notcher" and other prizes. Inspection of Chicago plant.

Monday Afternoon.—"The Fundamental Principles Governing the Right Use of Paint," by J. C. Beardslee, General Superintendent. "The Fundamental Principles Governing the Right Use of Varnish," by M. L. Sims, General Superintendent of varnish manufacturing department.

Tuesday Morning, October 29.—"S. W. P.—Knowledge of the Goods and Their Proper Application," by A. E. Schafer, Manager General Sales Department.

Tuesday Afternoon.—"Floor Finishes, Painters' Goods, Sundry Shelf Lines—Knowledge of the Goods and Their Proper Application," by A. E. Schafer, Manager General Sales Department. "Dry Colors," by H. M. Ashby, Superintendent Dry Color Works.

Tuesday Evening.—Smoker at Chicago Beach Hotel.

Wednesday Morning, October 30.—"C. & M. Paint and Color Specialties," by W. J. Sohlinger, Manager C. & M. Sales Department.

Wednesday Afternoon.—"C. & M. Paint and Color Specialties" (concluded). "Credits," by S. P. Fenn, Secretary and Treasurer.

Thursday Morning, October 31.—"C. & M. and Trade Sales Varnishes," by W. W. Mountain, Manager Varnish Sales Department.

Thursday Afternoon.—"C. & M. and Trade Sales Varnishes" (concluded). "Railroad Street Railway and Marine," by E. M. Williams, Manager Street Railway Sales Department.

Friday Morning, November 1.—"Salesmanship—Application of Practical Knowledge to Salesmanship," W. H. Cottingham, Vice-President and General Manager, chairman; assisted by J. F. Hommel, General Supervisor, and A. D. Joyce, Manager Southwestern District.

Friday Afternoon.—"Advertising and Promoting," L. R. Greene, Manager Advertising Department.

The entertainment features included the smoker mentioned in the programme, and a banquet on Friday evening. At the latter there were some important addresses made, the speakers including ex-Senator W. E. Mason; L. A. Goddard, President Fort Dearborn National Bank, Chicago; President Sherwin and Vice-President Cottingham, of the company.

In connection with the convention there was an exhibit of the various products of the company and a full line of advertising literature.

TRADE CATALOGUES.

Business Atlas and Shippers' Guide.—A new feature of the 1907 edition of the Business Atlas and Shippers' Guide, published by Rand, McNally & Co., Chicago, is the printing in red, on the state maps, of electric railways. An alphabetical list of all electric lines in the United States, including a complete index of all terminal points of the main and branch lines, is given. The list of steam railroads of the United States, Canada and Mexico, which is a regular feature of this atlas, is brought up to date, a special index giving the names of through lines and branches and points between which they run. The book is almost indispensable to the business man, and is useful to the railroad man.

Track and Railroad Supplies.—General catalogue No. 20, just issued by the Kalamazoo Railway Supply Co., Kalamazoo, Mich., covers the principal articles made by the company. They include

track drills, hand and push cars, velocipede cars, gasoline motor cars, jacks of several types, rail benders, pipe bending machines, replacer frogs, cattle guards, steel water tanks, water columns, pumping engines, snow scrapers, track gages and levels, and curve-lining gages. The book is 4½ in. x 7 in., leather-bound, and has 144 pages, with index and considerable useful information in the back.

Santa Fe Employees' Magazine.—The October number of this magazine is larger than previous issues. "An Old Train Register"; "Teamwork—Employees and the Public," and "Railroad Regulation," the last-named being Walker D. Hines' address to the New York Traffic Club, are leading articles. An article on "The Grand Canyon" is reprinted, and there is a story, "The Unclad Engineer," by a fireman on the road. The magazine has offered prizes to Santa Fe men for short stories—\$50, \$30 and \$20 for the first, second and third best, the time limit being the end of the year.

Muralt & Co., Engineers, 114 Liberty street, New York, have begun the issue of a small monthly bulletin under the title "Electric Trunk Line Age," of which the first number is dated October, 1907. The publication is to be a record of what electricity can do as a motive power under steam railroad conditions, with particular reference to the three-phase alternating current system. This first issue contains an illustrated description of the Simpon tunnel electric locomotives and an analysis of a typical steam road electrification problem.

MANUFACTURING AND BUSINESS.

The Isthmian Canal Commission has ordered 12 steam shovels from the Marion Steam Shovel Co., Marion, Ohio.

F. G. Whipple, formerly with the Weber Concrete Steel Chimney Co., Chicago, has been made Manager of the Sales Department of the Wiederholt Construction Co., Chicago.

S. T. DeLaMater, formerly with the Standard Construction Company, Chicago, has gone to the General Fireproofing Co., Youngstown, Ohio. He will be in the Youngstown office for the present.

The Tweedy-Randolph Co., Chicago, has been succeeded by Tweedy, Hood & Finlen, Inc., who will conduct the business under the same policy, and represent the same lines as heretofore. The office is in the Fisher building.

Joseph R. Foard and Arthur G. Wellington have been appointed receivers of the South Baltimore Steel Car & Foundry Co., Baltimore, Md. It is said that the receivership was caused because of the delay in collecting payment for cars delivered to railroads.

The Expanded Metal & Corrugated Bar Co., St. Louis, Mo., is furnishing the reinforcement for concrete work in the Pennsylvania Railroad's new terminal station in New York City. An order for 1,000 tons of corrugated bars was given by the contractor, The National Fireproofing Co.

The Pressed Steel Car Co., New York, and the Western Steel Car & Foundry Co. have opened offices in the National Bank of Commerce building, Fifth and Olive streets, St. Louis, with W. P. Coleman and his assistant, C. D. Terrell, in charge. They will handle business in the southwest.

With some ceremony and many speeches by the Mayor, railroad officers and guests, the first sod was turned, on October 26, at Ottawa, Canada, and work was begun on the new Central Union station, hotel and subway. The plans were made by Bradford Lee Gilbert, 50 Broadway, New York, and he will superintend the construction.

The Atha Steel Casting Co., Newark, N. J., was put in the hands of receivers last week. All of the stock of the company is owned by the Securities Investment Company, Pittsburgh, Pa., which is the holding company for the Westinghouse companies. The Atha company sells a great part of its output to the Westinghouse Electric & Manufacturing Co. and the receivership of the last named company tied up the funds due the Atha company, so that its receivership also became necessary.

The United States Steel Corporation has acquired control of the Tennessee Coal, Iron & Railroad Co. The T. C. I. & R. operates coal and iron mines, blast furnaces, foundries and 26 miles of railroad in Alabama and Tennessee and is the largest maker of open hearth rails in the country. It has outstanding about \$30,000,000 common stock and about \$15,000,000 bonds. The Steel Corporation is offering its 5 per cent. bonds in exchange, dollar for dollar, for the remaining T. C. I. & R. stock.

C. L. de Muralt, Consulting Engineer and Professor of Electrical Engineering at the University of Michigan, has been granted leave of absence from the university to supervise the electrification of the Arlberg tunnel under the Tyrolean Alps. Mr. Muralt has

been appointed Consulting Engineer of the Austrian State Railroads. The work to be done under his supervision will probably be the longest stretch of steam railroad electrified in either Europe or the United States, there being about 140 miles of road exclusive of the tunnel. The tunnel is on the main line from Paris to Vienna and is seven miles long, with steep grades from each mouth to the middle. When the plans developed by Mr. Muralt are carried out, the speeds of the trains passing over this line will have been increased 25 per cent. and the capacity of the road 50 per cent. Three phase alternating current locomotives will be used, developing 3,000 h.p., or about three times as much as the New Haven locomotives used in the New York suburban service. The locomotives designed for the Arlberg tunnel will, when coasting down the grade out of the tunnel, generate and return to the system about 60 per cent. of the energy used to pull the train up the grade into the tunnel.

Iron and Steel.

About 1,500 tons of rails have been ordered by traction companies.

The Great Northern has ordered 12,000 tons of rails for immediate delivery.

An inquiry is reported in the market for 7,500 tons of girder rails for Australia.

The Chilian State Railway has ordered 1,750 tons of light rails for delivery this year.

The United States Steel Products Export Company (United States Steel Corporation) has an order from the Japanese Government for 12,000 tons of 75-lb. rails. The price is said to be a little less than \$30 a ton.

OBITUARY NOTICES.

C. W. Sanders, Chief Engineer of the Copper Range Railroad, died of pneumonia a few days ago at Houghton, Mich.

Hugh B. Ely, who has been Superintendent of the Insurance Department of the Pennsylvania for 25 years, died last week at his home at Beverly, N. J.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad conventions and engineering societies, etc., see advertising page 24.)

Canadian Railway Club.

At the meeting of this club November 5, a paper on Standard Time by W. J. Camp, of the Canadian Pacific, was read.

Canadian Society of Civil Engineers.

At a meeting of the electrical section November 7, a paper on "The Calculation of Copper Conductors for Alternating Current Three-phase Transmission Lines," by F. B. Brown (M. Sc., S. Can. Soc. C. E.) was read.

American Society of Civil Engineers.

At the meeting of this society November 6 a paper on "Water Purification at St. Louis, Mo., by Edward E. Wall, was discussed. This paper was printed in the October "Proceedings."

St. Louis Railway Club.

At the meeting of this club November 8 a paper will be presented for discussion on the "Preservation of Wood Ties and the Forestry Department of a Railroad," by Chas. E. Koons.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Cincinnati, Hamilton & Dayton.—Edward Colston, a law partner of Judson Harmon, has been appointed General Counsel of the Cincinnati, Hamilton & Dayton, succeeding F. W. Stevens, resigned.

Galveston, Houston & Henderson.—See this company under operating officers.

New York, New Haven & Hartford.—John G. Parker, Secretary; Edward D. Robbins, Attorney, and Augustus S. May, Treasurer, have been elected Directors, succeeding Charles M. Pratt, Louis C. Ledyard and Richard Olney, who resigned last summer.

Tonopah & Goldfield.—C. K. Lord, formerly Third Vice-President of the Baltimore & Ohio, and later President of the Consolidation

Coal Company and of the Cumberland & Pennsylvania, has been elected President of the Tonopah & Goldfield, succeeding J. W. Brock, resigned.

Operating Officers.

Atlantic Coast Line.—V. R. C. King has been appointed Trainmaster of the Wilmington division, with office at Wilmington, N. C., succeeding T. L. Dumas, transferred to the Second division.

Canadian Pacific.—R. W. McCormick, Assistant Superintendent at Montreal, Que., has been transferred to Ottawa. W. B. Cronk succeeds Mr. McCormick.

Chicago & North-Western.—See Southern Pacific.

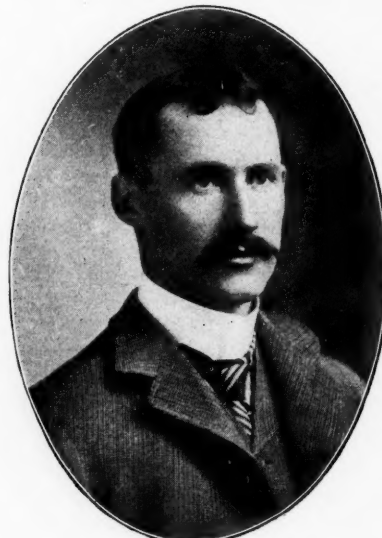
Chicago, Milwaukee & St. Paul.—L. R. Clausen, Signal Engineer, has been appointed Superintendent of the Prairie du Chien and Mineral Point divisions, succeeding E. D. Wright, resigned. Alexander Brown succeeds Mr. Clausen.

Chicago, Rock Island & Pacific.—H. R. Saunders, Superintendent at Little Rock, Ark., has been appointed Superintendent of Terminals at Kansas City, Mo., succeeding A. B. Copley, transferred.

Delaware, Lackawanna & Western.—J. G. Sickles, Trainmaster of the Morris & Essex division, has been appointed Assistant Superintendent of that division, with office at Hoboken, N. J. F. Cizek, Assistant Trainmaster, has been appointed Passenger Trainmaster. W. H. Bailey, Assistant Trainmaster, has been appointed Freight Trainmaster of that part of the division east of Dover, N. J., with office at Hoboken, N. J. M. J. McGowan, assistant chief train despatcher, has been appointed Freight Trainmaster of the part west of Dover, with office at Port Morris, N. J.

Galveston, Houston & Henderson.—J. H. Hill, who has for some months been Secretary and Treasurer, has been reappointed to his former office of Manager.

Great Northern.—J. M. Gruber, who was recently appointed General Manager of the Great Northern in charge of operation and maintenance, was born in 1868 at Iowa City, Iowa. After



J. M. Gruber.

a High School education he began railroad work as a stenographer in the general freight office of the St. Paul, Minneapolis & Manitoba. He later worked in the office of the General Manager and in 1889 went to the Atchison, Topeka & Santa Fe as a stenographer to the President. After a year he went to the Gulf, Colorado & Santa Fe, where he was chief clerk for a few months in the office of two superintendents, and was then appointed Assistant Trainmaster of the Northern division. After a year he was made Trainmaster of the Southern division and was then appointed chief clerk to the Superintendent of Transportation. After being chief clerk to the General Manager, he went to the Eastern of Minnesota as Assistant Superintendent. In 1895 he was appointed Superintendent of that road and in 1896 was made General Superintendent of the Montana Central. A year later he was appointed Assistant General Superintendent of the Eastern district of the Great Northern. In 1903 he was appointed General Superintendent of the Western district of the Chicago, Rock Island & Pacific, and the next year he went to the Union Pacific as General Superintendent. In 1905 he was appointed General Manager of the Chicago, Burlington & Quincy Lines East of the Missouri river, where he remained until he returned to the Great Northern last month.

Lehigh Valley.—C. T. O'Neill has been appointed Superintendent of the New York division, with office at Jersey City, N. J. This division consists of the road east of and including Parkview Station, N. J., together with the National Docks, Jersey City and Newark terminals.

Louisville & Nashville.—F. S. Griffin has been appointed General Agent at Detroit, Mich., succeeding L. R. Wasson, resigned to go into other business.

Mobile, Jackson & Kansas City.—Albert Franklin Church, who was recently appointed Superintendent at Laurel, Miss., was born in 1858 at New Iberia, La., being the eldest of a family of three. When he was five years old his father died. He went to school for five years and then, when he was 14 years old, went to sea. After four years he began railroad work on Morgan's Louisiana & Texas as a switchman. He was made a brakeman in 1878, freight conductor in 1880 and passenger conductor in 1882. Six years later he was made yard dispatcher. In 1903 he was appointed Trainmaster and in 1906 was made Train Inspector of the Atlantic system of the Southern Pacific, which includes the road he had been serving on. This position he recently resigned to go to the Mobile, Jackson & Kansas City.

New York Central & Hudson River.—H. J. Avery has been appointed Assistant Trainmaster of the Rochester division, with headquarters at Rochester, N. Y., succeeding M. E. Welch, transferred. The following have been appointed Assistant Trainmasters of the Mohawk division: L. Phelps, with office at Utica, N. Y., and W. H. Leonard and C. H. Steckel, with offices at Hoffmans, N. Y.

Pennsylvania.—C. R. Cosgrove has been appointed Assistant Trainmaster of the Buffalo division, succeeding D. C. Daley, transferred.

Panama Railroad.—J. Q. Matthews, Acting Superintendent of the Rio Grande Junction, has been appointed Superintendent of the Panama Railroad, succeeding J. A. Smith, promoted.

Rio Grande Junction.—See Panama Railroad.

St. Louis Southwestern of Texas.—C. J. Larimer has been appointed Superintendent at Mount Pleasant, Tex., succeeding W. N. Neff, transferred.

Southern Pacific.—W. R. Scott, General Superintendent of the Northern district of the Pacific system, has been appointed to the new office of Assistant General Manager of the Pacific system, with office at San Francisco, Cal. J. H. Young, Superintendent of the Western division, succeeds Mr. Scott, with office at San Francisco. T. A. Lawson, Assistant General Superintendent of the Chicago & North-Western, succeeds Mr. Young, with office at Oakland Pier, Cal.

See Union Pacific.

Union Pacific.—W. A. Worthington has been appointed Assistant to the Director of Maintenance and Operation of this company and of the Southern Pacific, with office at Chicago. Mr. Worthington will have special duties to be defined from time to time.

Traffic Officers.

Arkansas, Louisiana & Gulf.—T. J. Shelton has been appointed Traffic Manager, with office at Monroe, La.

Southern.—R. W. Hunt has been appointed Assistant General Passenger Agent at Atlanta, Ga.

Engineering and Rolling Stock Officers.

Buffalo, Rochester & Pittsburgh.—E. F. Robinson, who was recently appointed Acting Chief Engineer, has been appointed Chief Engineer, with office at Rochester, N. Y. G. C. Cleaver, roadmaster at Punxsutawney, Pa., succeeds Mr. Robinson as Assistant Engineer of Track, with office at Rochester, N. Y.

Chicago, Milwaukee & St. Paul.—See this company under operating officers.

Grand Trunk.—J. Markey, Master Mechanic of the Northern division, has been appointed Master Mechanic of the Middle division, with office at Toronto, Ont., succeeding W. Kennedy, resigned to go to the Central Vermont. J. R. Donnelley, Master Mechanic of the Ottawa division, succeeds Mr. Markey, with office at Allandale, Ont. W. Gell succeeds Mr. Donnelley, with office at Ottawa, Ont.

Houston & Texas Central.—Frank Cain, Master Mechanic of the St. Louis Southwestern of Texas at Texarkana, Tex., has been appointed Assistant General Master Mechanic of the Houston & Texas Central, with office at Houston, Tex.

Missouri Pacific.—J. J. Reid has been appointed Master Mechanic at Fort Scott, Kan., succeeding R. G. Long, resigned.

New York Central & Hudson River.—F. B. Freeman has been appointed Engineer of Construction in charge of track construction outside of the electric zone, with office at Grand Central Station, New York.

Pennsylvania.—H. H. Russell, supervisor of the Maryland division, has been appointed Assistant Engineer of the Allegheny division, with office at Pittsburgh, succeeding J. R. McGraw, who has been given leave of absence.

St. Louis Southwestern of Texas.—W. D. McDermott has been ap-

pointed Master Mechanic of the St. Louis Southwestern of Texas, with office at Texarkana, Tex., succeeding Frank Cain. See Houston & Texas Central.

LOCOMOTIVE BUILDING.

The Southern is said to have ordered 25 locomotives from the Baldwin Locomotive Works.

The Maine Central is said to have ordered 10 locomotives from the Baldwin Locomotive Works.

The Peruvian Government has ordered one mogul locomotive from the American Locomotive Co.

The Florida East Coast is said to have ordered 12 locomotives from the American Locomotive Company.

The Southern Indiana is said to have ordered 10 locomotives from the American Locomotive Company.

The Isthmian Canal Commission has ordered four locomotives from the Davenport Locomotive Works.

The Doles & Shepard Co. has ordered one six-wheel switching locomotive from the American Locomotive Co.

The Muscatine, North & South has ordered one mogul 50-ton locomotive from the Hicks Locomotive & Car Works.

The United States Engineering Office, through S. W. Roessler, Portland, Ore., is in the market for three locomotives.

The Chicago & Illinois Western has ordered one switch engine from the American Locomotive Co. for January delivery.

The Taiwan Sugar Refinery, Formosa, has ordered three four-wheel tank locomotives from the American Locomotive Co.

The Howell-Hinds Consolidated Mining Co. has ordered one four-wheel tank locomotive from the American Locomotive Co.

The Japanese Government is said to have ordered six locomotives from the Baldwin Locomotive Works through Fraser & Sale, New York.

CAR BUILDING.

The South Georgia is said to be in the market for 100 freight cars.

The Grand Trunk is asking for bids in the United States on 1,000 steel coal cars.

The Atlantic & Western has ordered 60 box cars from the Lenoir Car Company.

The Kanawha & West Virginia is still in the market for from 700 to 1,500 freight cars.

The Northwestern Pacific is asking prices on trucks for 10 flat cars of 70,000 lbs. capacity.

The Tonopah & Goldfield has ordered four chair, one smoking and one baggage car from the Pullman Company.

The San Antonio & Aransas Pass has ordered 25 standard Hart convertible cars from the Rodger Ballast Car Co.

The Duluth, Missabe & Northern, as reported in the *Railroad Gazette* of July 5, is asking new bids on passenger equipment.

The New York City Railway has ordered 120 standard type street cars since it placed the order for 155 Montreal type cars.

The Nevada Northern is said to have ordered 100 all-steel gondola cars of 100,000 lbs. capacity from the Pressed Steel Car Company.

The Choctaw Railway & Lighting Co., McAlester, Okla. T., has ordered two standard interurban cars from the Niles Car & Manufacturing Co.

The Chicago & Illinois Western has ordered two cabooses from the American Car & Foundry Company, and will be in the market for passenger cars in about two months.

The South Manchuria has ordered through Mitsui & Co., New York, three dining, three sleeping, six passenger and baggage, four baggage and mail cars and six coaches from the Pullman Co.

The Nashville, Chattanooga & St. Louis, as reported in the *Railroad Gazette* of November 1, has asked preliminary bids on 100 composite hopper bottom coal cars of 80,000 lbs. and 100,000 lbs. capacity. The special equipment has not yet been considered.

The Brooklyn Rapid Transit, which, as reported in the *Railroad Gazette* of September 20, was in the market for 100 surface cars and 100 elevated cars, has, it is said, decided not to order the surface cars, but will order the elevated cars within a few months.

The Philippine Railways, as reported in our advance sheet of October 26, are in the market for four combination parlor and first class passenger cars. The order is to be placed through J. G. White & Company. These cars will measure 42 ft. 3½ in. long and 7 ft. 9¼ in. wide, inside measurements, and 43 ft. 1½ in. long and 9 ft. 6 in. wide, over all. The bodies will be of wood and the underframes of open hearth steel. The special equipment includes:

Axles	Philippine Railways standard
Bolsters	Philippine Railways standard
Brake-beams	Buffalo
Brakes	Westinghouse automatic
Brasses	Phosphor bronze
Couplers	Major
Draft rigging	Miner
Heating system	None
Journal boxes	Cast iron; Philippine Railways standard
Light	Adams & Westlake oil lamps
Paint	Dixon's Graphite, for steel work
Platforms	Standard Coupler Co.
Seats	Wheeler
Trucks	Philippine Railways standard

The Boston & Maine, as reported in the Railroad Gazette of November 1, has ordered 1,000 box cars of 60,000 lbs. capacity from the Laconia Car Company for July, 1908, delivery. These cars will measure 36 ft. long, 8 ft. 6 in. wide and 8 ft. ½ in. high, inside measurements; 37 ft. 6 in. long, over end sills; 9 ft. 7¼ in. wide, over eaves, and 13 ft. 11½ in. high, over brake staff. The bodies will be of wood and the underframes of steel. The special equipment includes:

Brake-beams	Buffalo
Brake-shoes	Steel back; American Brake-Shoe & Foundry Co.
Brakes	Westinghouse automatic
Brasses	Boston & Maine specifications
Couplers	Gould steel
Door fastenings	Boston & Maine standard
Draft rigging	Miner tandem
Dust guards	Wooden
Journal boxes	Boston & Maine standard
Paint	Boston & Maine specifications
Roofs	Murphy No. 2 inside
Springs	Railway Steel-Spring Co.
Wheels	Laconia

The Duluth & Iron Range, as reported in the Railroad Gazette of October 11, has ordered three first class coaches and two combination baggage and mail cars from the American Car & Foundry Co., for January, 1908, delivery. These cars will be 60 ft. 7 in. long, 10 ft. ½ in. wide and 14 ft. 1½ in. high, over all. The special equipment for both includes:

Bolsters	Commonwealth
Brake-beams	National-Hollow
Brake-shoes	Christie
Brakes	Westinghouse
Brasses	American Car & Foundry Co.
Couplers	Buckeye
Curtain fixtures (for coaches)	Forsyth
Curtain material (for coaches)	Pantasote
Door fastenings (for coaches)	Adams & Westlake locks
Draft rigging	American Car & Foundry Co.
Heating system	Safety Car Heating & Lighting Co.
Journal boxes	McCord
Light (for coaches)	Adams & Westlake; Acme
Light (for combination)	Bliss electric
Paint	Duluth & Iron Range standard
Platforms	American Car & Foundry Co.
Trucks	Commonwealth Steel Co.
Vestibule	Pullman

RAILROAD STRUCTURES.

BELLAIRE, OHIO.—Plans, it is said, are being made by the Baltimore & Ohio for improvements to its freight terminals here to cost \$25,000.

BROOKLYN, N. Y.—The new concrete car barns, 86 ft. x 352 ft., for the Brooklyn Rapid Transit Co. at Fresh Pond station, on the Ridgewood line, have been finished. The cost of the improvements was \$125,000.

BLUFFTON, IND.—The Lake Erie & Western and the Cincinnati, Bluffton & Chicago, it is said, will jointly build a union passenger station here.

GRAND FORKS, B. C.—The Canadian Pacific, it is said, will make this place a division point, and next year will spend about \$100,000 for a roundhouse, shops and a new yard.

LAWRENCEVILLE, PA.—An ordinance is being prepared for a bridge from Liberty avenue and 37th street over the Pennsylvania tracks to Grant Boulevard.

LONDON, ONT.—The Southwestern Traction Company, it is said, will rebuild its car barns recently destroyed by fire, at a loss of \$150,000.

ST. STEPHEN, N. B.—The New Brunswick Southern has asked for authority to build a bridge over the St. Croix river at this place.

SWISSVALE, PA.—The Pennsylvania will shortly ask bids for a new passenger station. Grade crossings are to be eliminated and other improvements made to cost \$75,000.

WICHITA, KAN.—General Manager J. E. Hurley is quoted as saying that the Atchison, Topeka & Santa Fe will make improvements next year to include a passenger station here to cost about \$200,000; also a roundhouse to cost \$16,000.

WINNIPEG, MAN.—Work, it is said, has been started on the new union terminal station here. Contracts for the excavation work let to S. Brown, of this place.

The Canadian Northern, it is said, in addition to improvements under way will put up a roundhouse here, to cost \$50,000.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—President E. P. Ripley, of this company, is quoted as saying that proposed extensions in Texas to cost \$7,000,000 will not be made this year, perhaps not for many years, on account of the financial stringency and adverse legislation in Texas.

ATLANTIC CITY RAILWAY (ELECTRIC).—See Philadelphia, Delaware & Montgomery.

BALTIMORE & OHIO.—See Pennsylvania Roads.

BELLEVILLE & INTERURBAN.—Incorporated in Illinois with \$100,000 capital and office at Belleville. The company proposes to build an electric line from Belleville south eight miles to Smithton. The incorporators and first board of directors are: J. Gundlach, Jr., B. H. Gundlach, R. W. Hofsommer, G. Hippard and T. A. Bell.

BLOOMINGTON, PONTIAC & JOLIET (ELECTRIC).—This company, which operates an electric line from Pontiac, Ill., northeast to Dwight, 20 miles, it is said, is now controlled by H. A. Fisher, of the Chicago & Joliet Railway. It is the intention of the company to extend the line on the north to Joliet, about 40 miles, where connection is to be made with C. & J. to Chicago. The line is eventually to be extended from its southern terminus at Pontiac southwest to Bloomington, 35 miles, where connection is to be made with an electric line to St. Louis.

BRISTOL & KINGSPORT.—Incorporated in Tennessee to build a line from Bristol, Tenn., southwest to Blountville, thence west to Kingsport, 45 miles. The incorporators include: J. L. Cox, F. H. Cathran, F. Percell, J. B. Cox and S. L. King, of Bristol.

BROOKVILLE & MAHONING.—See Pittsburgh, Shawmut & Northern.

CHICAGO & MILWAUKEE (ELECTRIC).—Albert C. Frost, President and General Manager of this company, says that the extension to Milwaukee will be finished and cars will be put in operation from Chicago to Milwaukee on December 1.

CHICAGO, BURLINGTON & QUINCY.—This company, it is said, has surveys made for building a line from Frannie, Wyo., northwest along Clark's Fork river to Fromburg, Mont., on the Northern Pacific, about 35 miles.

CHICAGO, FOX LAKE & GENEVA.—Incorporated in Illinois with \$2,000,000 capital and office at Chicago. The company proposes to build a line from Chicago, northwest through Cook, Lake and McHenry counties to the Illinois-Wisconsin state line, with branches to Fox Lake and to Woodstock, a total of 90 miles. The incorporators include G. H. Soward, H. R. Yaryan, L. E. Stárr, S. E. Malette and M. L. Louis.

CANADIAN PACIFIC.—This company, it is said, has been making surveys for several weeks for an extension of its Nicola, B. C., branch, south to Princeton in the Similkameen Valley, about 72 miles.

CHICAGO & EAST ST. LOUIS SHORT LINE.—Incorporated in Illinois to build a line from East St. Louis, Ill., northeast to Chicago, 275 miles. The proposed route runs through coal fields and is almost parallel to the Chicago & Alton all the way. Surveys are to begin at once. The incorporators and first board of directors include: H. C. Osterman, W. M. Drennan, H. C. Dolph, T. W. Flynn and W. Anderson, all of Chicago.

CHICAGO & JOLIET (ELECTRIC).—See Bloomington, Pontiac & Joliet.

CINCINNATI BELT LINE.—The proposed belt line around Cincinnati, Ohio, is to be double-track and will be about 20 miles long. Right-of-way is being secured and surveys made. The promoters say that necessary capital has been secured. E. E. Williamson, Union Trust Building, Cincinnati, is interested. (July 26, p. 111.)

EASTERN PENNSYLVANIA (ELECTRIC).—J. G. White & Co., operating managers and purchasing agents for this company, have ordered \$200,000 worth of electric supplies for the Tamaqua and Middleport connecting link between Mauch Chunk, Pa., and Pottsville. The order includes all the material required for the permanent way and overhead electrical work. Considerable grading has already been done.

GILMORE & PETERSBURG.—The Gilmore Mining Company, it is said, is making surveys for a line from Gilmore, Idaho, on the Lemhi Valley northeast through a pass in the Rocky mountains to a point

in Beaverhead county, Mont., about 50 miles. W. A. McCutcheon, Gilmore, Idaho, is Manager.

ILLINOIS CENTRAL.—This company, it is said, will spend about \$10,000 improving its yards at Duquoin, Ill.

MILWAUKEE NORTHERN (ELECTRIC).—This line was opened from Milwaukee, Wis., north, via Cedarburg, to Port Washington, 70 miles, November 2. The company will occupy jointly with the Chicago-Milwaukee Electric Railway a large station to be built at Second and Wells streets, Milwaukee, at an estimated cost of \$100,000. (Sept. 20, p. 339.)

MISSOURI & NORTH ARKANSAS.—This company will let contracts for 650,000 cu. yds. of side borrow, and three miles of pile trestle on its extension from Kensett, Ark., southeast to Cotton Plant 28 miles. (Sept. 27, p. 371.)

MISSOURI PACIFIC.—The report of this company for the year ended June 30, 1907, shows that the branch of the St. Louis, Iron Mountain & Southern from Eudora, Ark., south to Calvit, La., 37.49 miles, was finished, and put in operation June 1. On the Gurdon & Fort Smith, which extends from a connection with the Arkansas Southwestern near Antonine, Ark., northwest through Clark and Pike counties to Caddo Gap, on Caddo river, 3.85 miles, grading, bridging and track laying has been finished and ballasting is now under way. The continuation of this line, the Gurdon & Fort Smith Northern, from Caddo Gap north to the Ouachita river, 23 miles, has the grading, bridging and track laying finished on the first 5.74 miles to a point near Black Springs. Its further extension is not now contemplated. On the Springfield Southwestern from Crane, Mo., to Springfield, regular service was begun last April. Work on the extension through the city of Springfield is now in progress. On the Illinois division second main track has been finished from Valley Junction south for 8.9 miles, and at the yards at Dupu, Ill., grading for 38 miles of tracks, culverts, bridging, drainage system, coaling station, 18-stall engine house, power house and employees' hotel is finished, and yard tracks aggregating 21.61 miles have been laid. Track laying and ballasting is now in progress. On the Wabash Southern, grading, bridging, track laying and some of the ballasting on nine miles from Ziegler, Ill., to Benton is finished. The Coal Belt Railway lines in Williamson county, Ill., to the Cartersville District Coal Company's mines and to the Chicago & Big Muddy Coal & Coke Company, aggregating 5.01 miles, have been finished and are now in operation. Grading for an extension of the Coal Belt Electric on Park avenue, Herrin, Ill., north 4,935 ft. to a connection with the Herrin Railway is finished. The main line of the Herrin & Johnson City from Herrin, Ill., to a point near the west limits of Johnson City, 4.5 miles, is finished, and 2.5 miles of side tracks have been laid to the various mines. The Marion & Harrisburg, which diverges from the Coal Belt Electric west of and extending east through the city of Marion, Ill., 1.95 miles, has been finished and is now in operation. The Marion & Johnson City, a continuation of the Marion & Harrisburg, from a point east of Marion north 5.87 miles toward Johnson City with connections and yards approximating 6.81 miles to various coal properties, is finished. Work is now under way extending the line to Johnson City. The Natchez & Western has been changed to standard gage, the work of widening embankments and filling and reconstructing bridges is now in progress.

NEWPORT & SHERMAN'S VALLEY.—This company, which operates a 29-mile line in Pennsylvania, intends to change its track from narrow to standard gage.

NEW YORK, NEW HAVEN & HARTFORD.—Contractors double-tracking the Naugatuck and Highland divisions of this road have received orders to rush the work as fast as possible.

OKLAHOMA CENTRAL.—This company, it is said, has finished eight miles of the extension it is building from Blanchard, Okla., west to Chickasha. (Aug. 9, p. 164.)

OKLAHOMA, MEXICO & PACIFIC.—Incorporated in Oklahoma with \$500,000 capital and office at Oklahoma City. The company proposes to build a line from Oklahoma City southwest through Oklahoma, Canadian, Caddo, Washita and Kiowa counties to Hollis, in Greer county, 200 miles. The estimated cost of the proposed line is \$35,000 a mile. The incorporators include: J. E. Kirkes, O. S. Rice and T. H. Lindlay, of Oklahoma City; F. D. Kroeger and J. M. Kroeger, of Guthrie.

OMAHA, NEWPORT & NORTHERN.—Under this name a company is reported being organized in South Dakota with \$8,000,000 capital to build a line from Omaha, Neb., northwest, traversing the counties of Douglas, Washington, Dodge, Colfax, Platt, Boone, Wheeler, Holt, Rock and Keyapaha in Nebraska, to a point in South Dakota, 250 miles. C. A. Miller, of Minneapolis, Minn.; O. W. Boyd, P. M. Banning, of Chicago, and M. P. Goodner, of Pierre, are interested.

PENNSYLVANIA.—This company has put in operation its new yard at Pitcairn, which has a capacity for 3,300 cars.

PENNSYLVANIA ROADS.—Final surveys, it is said, are being made

for a line from Ohio Pyle, Pa., on the main line of the Baltimore & Ohio south to coal fields in West Virginia. Grading work will probably be begun next month. The project is backed by capitalists interested in the recently organized Preston Coal Company, which is to develop the coal lands along the proposed line, and it is thought that the Baltimore & Ohio also is interested.

PITTSBURGH, SHAWMUT & NORTHERN.—Work, it is said, has been finished on the Brookville & Mahoning, building the southern extension from Brockwayville, Pa., south via Brookville to Ramseystown, and the line is ready for operation. (Aug. 30, p. 247.)

PHILADELPHIA, DELAWARE & MONTGOMERY (ELECTRIC).—A number of New York and Philadelphia capitalists have secured control of this company, organized by B. A. Hughes and associates to build an electric line from Lafayette, Pa., on the Schuylkill Valley division of the Pennsylvania, south to the Delaware river in Delaware county, at which point a two track tunnel to cost \$2,000,000 is to be driven under the river. East of the river at Woodbury, N. J., the line is to connect with the West Jersey & Seashore or a new line is to be built to Atlantic City. Surveys to the Delaware river have been made. The following are officers of the Atlantic City Railway, which, it is said, will build over the same route. W. J. Thompson, President; G. A. Muller, Treasurer, and Edward Butler, Secretary, Philadelphia.

ST. LOUIS, ROCKY MOUNTAIN & PACIFIC.—Surveys reported made for building the Cimarron & Northwestern from Cimarron, N. Mex., northwest up the Ponil river to Ponil Park, 22 miles. Grading finished on 15 miles, and three miles of track laid. General contract reported let to the Whitescarver Construction Company, of Trinidad, Colo., and sub-contracts to Maney Bros., of Oklahoma City, Okla. (May 3, p. 632.)

SASKATOON, SASKATCHEWAN, PEACE RIVER & DAWSON.—Application will be made at the next session of Parliament for the incorporation of this company, which proposes to build a line from Saskatoon, Sask., northwest via Langham, Athabasca Landing and Peace River Landing in Alberta to the crossing of the Dease river, B. C., about 15 miles west of its outlet into Laird river, thence by the most direct route to Dawson, in Yukon territory. Smith & Britton, Confederation Life Building, Ont., are the attorneys.

SOUTH & WESTERN.—This company, building from Elkhorn, Ky., south to Rutherfordtown, N. C., has 75 miles in operation; 7.4 miles from Dante, Va., south to Fink, and 67.6 miles from Johnson City, Tenn., south to Altapass, N. C. Contracts are let for 82 miles from Johnson City north to Fink, Va., on the north end, and from Altapass south to Bostic, 62 miles. An extension is also to be built under the name of the Spartanburg & Northern from the southern end, south to Spartanburg, S. C., 40 miles. It is said that the contractors who are most advanced in their work have begun to lay off men. This is being done to allow the contractors who are behind with their work to catch up. About 10,000 men are at work on the southern line, and about two-thirds will be kept at work. (March 15, p. 392.)

SOUTHERN PACIFIC.—Twenty-four sidings between Roseville and Truckee are being lengthened, so that after this month trains of 45 instead of 30 cars can be sent across the Sierra Nevada mountains. These 700-ft. additions to 24 sidings had to be built mostly on mountain ledges, an enormously difficult and expensive undertaking. One-half the sidings are in the 46 miles of snow-sheds which enclose the road between Blue Canyon and Truckee. The extension of the snow-sheds alone required 7,000,000 ft. of lumber. At Summit an entirely new track 3,100 ft. in length was put in. The company is laying a second main track between Truckee and Winsted, and also between Elvas and Loomis. This work is almost completed, and with the terminal improvement at Roseville will double the capacity of the division. In the new Roseville classification yard 50 miles of track will be laid. Work is also being pushed on additional roundhouse facilities and repair shops at Roseville.

TACOMA-SEATTLE SHORT LINE (ELECTRIC).—Incorporated in Washington with \$6,000,000 capital to build an electric line from Tacoma north to Seattle, 30 miles. Most of the right-of-way has been secured, and it is expected to have the line finished early in 1909. The proposed line is to be six miles shorter than the present interurban line belonging to the Stone & Webster Syndicate of Boston. T. Coleman Dupont, President, of Wilmington, Del., and A. C. Degraw, of New York, represent Eastern financial interests, which are back of the project.

TEMISKAMING & NORTHERN ONTARIO.—This company expects to finish the branch it is building from Cobalt, Ont., to Kerr Lake, four miles, about the first of next month. (March 15, p. 396.)

TEXAS MIDLAND.—See Texas Roads.

TEXAS ROADS.—Plans are being made for building a line from Ennis, Tex., the southern terminus of the Texas Midland, southwest to Waco, 75 miles. This is supposed to be a project of the Texas

Midland, as D. Quill and W. J. Newcom, of that company, are interested.

TOPEKA-SOUTHWESTERN.—An officer writes that contracts have been let to the Southwestern Construction Company, of Topeka, Kan., for building this proposed line from Topeka, Kan., southwest to Council Grove, with a branch from the main line just west of Topeka north to the Kansas river, 60 miles. There will be a steel bridge at Dover. Maximum grades will be 1 per cent. and maximum curvature 4 deg. The company has preliminary work under way for building extensions and branches as follows: From Topeka north to Willis, 45 miles; from a junction with this north extension at North Topeka east to Leavenworth, 32 miles; from a point seven miles southwest of Topeka south via Scranton and Lyndon to Burlington, 60 miles, and from Council Grove, to which the main line is now being built southwest via Diamond Springs to Marion, 40 miles. W. L. Taylor, President; V. R. Parkhurst, Chief Engineer, Topeka. (April 5, p. 500.)

UNION CENTRAL.—This company proposes to build a line from Dallas, Tex., southeast to New Orleans, La., 500 miles (225 miles in Texas and 275 miles in Louisiana). It is reported that contracts are to be let about Jan. 1. The proposed route is via Wortham, Palestine and Nacogdoches, Tex., and Pickering, La., with a branch from Wortham, Tex., northeast to Tyler, 90 miles. Surveys on the main line are under way from Dallas to the Louisiana state line, and surveys for the branch from Wortham to Tyler have been made. Grading is finished on the first 20 miles from Wortham. J. A. Lucas, Edgewood, Tex., is Secretary and Treasurer.

WEST PENN RAILWAYS (ELECTRIC).—Rights-of-way, it is said, have been secured by this company for a new line from Hunkers, Pa., west to Scotthaven, 10 miles.

RAILROAD CORPORATION NEWS.

BALTIMORE & OHIO.—See Chicago Terminal Transfer.

BOSTON & WORCESTER STREET.—The Massachusetts Railroad Commission has given this company permission to issue \$300,000 new stock to shareholders at par to retire floating debt incurred for construction, equipment and the purchase of property. The company had asked permission to issue \$500,000 new stock.

CHICAGO, BURLINGTON & QUINCY.—According to a press despatch, this company has taken over the operation of the Great Northern's line from Sioux City, Iowa, to O'Neill, Neb., 130 miles. The Burlington controls all the other Hill mileage in Nebraska.

CHICAGO TERMINAL TRANSFER.—The minority stockholders' protective committee, which represents 38 per cent. of the preferred stock and 14 per cent. of the common stock of the Chicago Terminal Transfer, has sent out a circular letter announcing that the Baltimore & Ohio has suggested that the stock deposited in accordance with the offer of the last named company to buy it at \$25 a share, be left on deposit until December 31. This is because it is not considered advisable for the Baltimore & Ohio to make the purchase under present market conditions.

CINCINNATI, HAMILTON & DAYTON.—See Pere Marquette.

GEORGIA COAST & PIEDMONT.—The Georgia Railroad Commission has given this company permission to issue \$2,700,000 of its \$3,500,000 authorized consolidated mortgage 5 per cent. bonds of 1947. The proceeds are to retire \$1,000,000 authorized first mortgage bonds, \$550,000 for construction and acquiring additional mileage and the remainder for equipment, terminals at Brunswick and to pay other indebtedness. The road runs from Darien, Ga., to a connection with the Seaboard Air Line at Collins, Ga., and is projected to Brunswick, 15 miles.

GREAT NORTHERN.—See Chicago, Burlington & Quincy.

METROPOLITAN STREET RAILWAY.—See Third Avenue Railroad (Electric).

MEXICAN CENTRAL.—See National of Mexico.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—It is said that the stockholders have so far subscribed to three-quarters of the additional stock of this company, and that the Canadian Pacific will take whatever stock is not subscribed to by other stockholders. The new issues consist of \$1,400,000 preferred and \$2,800,000 common. One share of new preferred and two of new common are offered to holders of each 15 shares of either class of old stock.

NATIONAL LINES OF MEXICO.—The attorney who represents the Mexican Government in the proposed merger of the National of Mexico and the Mexican Central is quoted as saying that no further steps can be taken at present because the bankers who were to underwrite the proposed bond issue cannot do so at present. (July 12, p. 54.)

NEW YORK CENTRAL & HUDSON RIVER.—Results for the last quarter and for nine months were as follows:

Quarter Ended Sept. 30, 1907.		1907.	Change
Gross earnings	\$27,069,728	Inc.	\$2,286,761
Expenses	18,579,635	"	1,285,494
Net earnings	\$8,490,093	Inc.	\$1,001,267
Other income	2,523,560	"	953,774
Gross income	\$11,013,653	Inc.	\$1,955,041
First charges and taxes	5,879,277	"	358,957
Available for dividend	\$5,134,376	Inc.	\$1,596,084
Dividend (1½ per cent.)	2,679,480	"	814,507
Surplus	\$2,454,896	Inc.	\$781,577
Nine Months Ended, Sept. 30, 1907.		1907.	Change
Gross earnings	\$74,000,625	Inc.	\$6,338,431
Expenses	55,980,150	"	7,910,094
Net earnings	\$18,020,475	Dec.	\$1,571,663
Other income	7,434,637	Inc.	2,619,615
Gross income	\$25,455,112	Inc.	\$1,047,952
First charges and taxes	17,373,369	"	797,469
Available for dividend	\$8,081,743	Inc.	\$250,483
Dividends (4½ per cent.)	8,038,440	"	2,443,522
Surplus	\$43,303	Dec.	\$2,193,039

NEW YORK CENTRAL LINES.—Gross earnings for the month of September were as follows:

	1907.	Change
New York Central & Hudson River	\$9,035,991	Inc. \$605,754
Lake Shore & Michigan Southern	4,082,327	" 312,481
Lake Erie & Western	498,825	" 33,118
Chicago, Indiana & Southern	256,667	" 55,430
New York, Chicago & St. Louis	882,117	" 69,655
Michigan Central	2,553,788	" 276,574
Cleve., Cin., Chic. & St. Louis	2,461,252	" 234,236
Peoria & Eastern	271,753	" 10,288
Cincinnati Northern	94,310	Dec. 4,709
Pittsburgh & Lake Erie	1,407,359	Inc. 209,528
Rutland	314,342	" 40,727

NEW YORK, NEW HAVEN & HARTFORD.—At a meeting of the shareholders, held last week, the directors were authorized to either issue \$35,469,500 new stock to be offered to stockholders at \$125 at the rate of one new share for every four shares already held, or instead to issue \$43,121,200 new stock to be offered to stockholders at par at the rate of one new share for every three shares held. The first plan was the one originally proposed when the meeting was first called. The proceeds of the new stock are to be used for finishing the six-tracking of the Harlem River branch, the improvements at the New Haven cut and at Providence, R. I., and also to pay for new equipment costing \$18,000,000 ordered some time ago. It is said that part will be used to retire \$8,500,000 debenture bonds.

OREGON SHORT LINE.—See Union Pacific.

PENNSYLVANIA.—President McCrea announced last week that, because of the unsatisfactory outlook for raising new capital in 1908, the company would not begin any new work except when absolutely necessary for handling traffic. Work on the New York tunnels and terminals would not, therefore, be pushed as rapidly as heretofore and their completion will probably be six months later than has been expected.

PERE MARQUETTE.—The meeting held on October 28 to approve the reorganization plan was adjourned without final action because the committee representing the holders of \$8,500,000 C., H. & D. refunding 4 per cent. bonds protested against the plan. These bonds were given to the present holders in exchange for \$11,000,000 Pere Marquette common stock which is deposited as collateral for the bonds, and the committee objected to the voting of this stock in favor of the reorganization plan, on the ground that this plan, which provides for the issue of two classes of preferred stock, would hurt the holders of the common stock.

RUTLAND RAILROAD.—At the annual meeting the minority stockholders' committee voted 22,826 shares of 7 per cent. preferred stock out of the total of 69,750 shares voted. The Directors passed a resolution to take up the question of accumulated dividends on the preferred stock, which now amount to 171½ per cent. In 1906 and 1907 1½ per cent. annually was paid. (Nov. 16, 1906, p. 138.)

SOUTHERN PACIFIC.—See Union Pacific.

THIRD AVENUE RAILROAD (ELECTRIC).—The quarterly dividend of 1½ per cent. on the \$15,995,800 outstanding stock of the Third Avenue Railroad, which is the rental paid by the lessee, the Metropolitan Street Railway, has been defaulted by order of the receivers of the last-named company. The Third Avenue was leased to the Metropolitan in 1900 for 999 years, and the lease provides that six months after a dividend default the property shall be returned to its stockholders.

UNION PACIFIC.—The lines of this company from Green river, Wyo., to Ogden, Utah, will hereafter be operated by the Union Pacific, and the Southern Pacific lines between Ogden, Utah, and Sparks, Nev., will be operated by the Southern Pacific. Hitherto the Oregon Short Line has operated these lines.